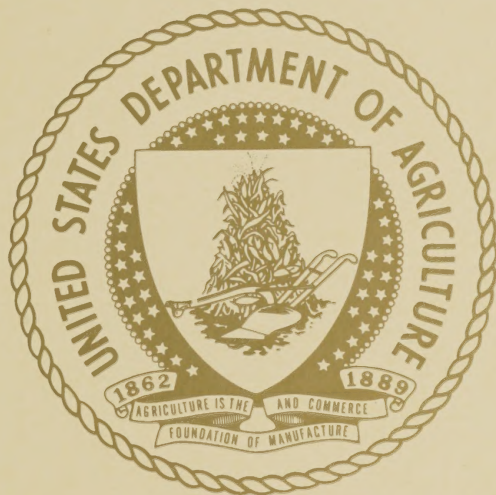


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Secretary's Advisory Committee on



Foreign Animal and Poultry Diseases

United States
Department of
Agriculture



National Agricultural Library

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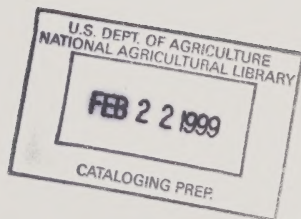
Ball Room East

August 14, 1989

7:00 p.m. - 9:00 p.m.

Welcome
Opening Remarks
Presentation of Certificates

Ms. Jo Ann Smith
Assistant Secretary,
Marketing and
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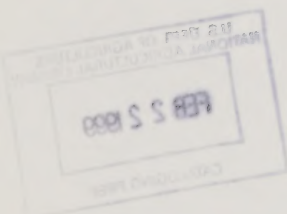


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APHIS/ARS PLUM ISLAND SEMINAR FOR MEMBERS OF THE
SECRETARY'S ADVISORY COMMITTEE
ON FOREIGN ANIMAL AND POULTRY DISEASES

Plum Island Animal Disease Center
Plum Island, NY
516 323-2500

The Library Room

August 15, 1989

6:30 a.m.	Buffet Breakfast	Hotel Restaurant
7:00 a.m.	Leave Hotel	
7:30 a.m.	Arrive Saybrook Point Marina	
8:10 a.m.	Arrive Plum Island	
8:15 a.m. - 9:00 a.m.	Remarks	Dr. Charles E. Hess Assistant Secretary, Science and Education
	Report of APHIS Activities and Plans	Dr. James W. Glosser Administrator, APHIS
	Report of ARS Activities and Plans	Dr. R. D. Plowman Administrator, ARS
9:00 a.m. - 10:00 a.m.	Group Discussion	
10:00 a.m. - 10:15 a.m.	Break	
10:15 a.m. - 12:00 noon	Agricultural Research Service Activities and Plans for Plum Island	Dr. Roger Breeze Director, Plum Island
12:00 noon - 12:30 p.m.	Lunch at Plum Island	
12:30 p.m. - 3:00 p.m.	Review Plum Island Animal Disease Center and the Foreign Animal Disease Diagnostic Laboratory	
3:30 p.m.	Leave Plum Island via Orient Point	
4:30 p.m.	Arrive Saybrook Point Marina	
4:30 p.m. - 6:00 p.m.	Group Discussion	Saybrook Marina Conference Room
6:30 p.m.	Arrive Colony Inn Hotel	

U.S. Department of Agriculture

July 19, 1984

SUBJECT: ARS/APHIS Response to "Long-Term Planning for Research and Diagnosis to Protect U.S. Agriculture from Foreign Animal Diseases and Ectoparasites"

TO: J. K. Atwell, Deputy Administrator
Veterinary Services, APHIS

D. B. Laster, Associate Deputy Administrator
National Program Staff, ARS

We were asked to prepare a tentative joint response to issues, comments, and recommendations made by the NAS in the subject report. In the time allotted, the response focused on the underscored and bulleted summary in the first 10 pages of the report. Issues, comments, and recommendations were evaluated in the context of four categories of possible action considerations:

1. The issue, comment, or recommendation was considered to be within the program responsibility of either ARS, APHIS, or both.
2. If a response could be made specific to foreign animal diseases and ectoparasites, not reaching across other programs of research and diagnosis, a positive, favorable, or unfavorable classification was assigned.
3. Implementation was considered possible, probable, or likely with or without the need for additional funding and other resources.
4. Need for further study by one or both agencies was expected in this category.

Page 4, Paragraph 3: Except for the Secretary of Agriculture, there is no central USDA authority for specific management and oversight of FAD&E research and diagnosis.

- Response:
1. ARS/APHIS.
 2. Plans are being developed to implement increased coordination of FAD&E research and diagnosis.
 3. No additional funds needed.

Page 5, Paragraph 1: Strategic plans for FAD&E research and diagnosis must be reviewed at least every three years by USDA, by FAD&E specialists, and by the wider biomedical science community and must be revised as developments warrant.

- Response:
1. ARS/APHIS.
 2. Will implement recommendation.
 3. No additional funds.

Page 5, Administration, First Bullet: USDA should appoint an FAD&E Program director responsible directly to the Administrators of both ARS and APHIS for FAD&E research, investigation, and diagnosis.

- Response:
1. ARS/APHIS.
 2. Will implement by appointing a person in each agency to serve as key contact point on FAD&E for increased coordination of activities consistent with overall mission and priorities of the two agencies.
 3. No additional funds required.

Page 5, Administration, Second Bullet: USDA should work toward integration of its animal-health activities into a single manager service.

- Response:
1. ARS/APHIS.
 2. Will respond by continuing to increase level of coordination.
 3. Implementation needs further study. Not within our policy decision capacity.

Page 5, Administration, Third Bullet: USDA should increase coordination with other federal agencies and foreign institutions.

- Response:
1. ARS/APHIS.
 2. Plans are in effect to respond--OICD, BARD--and to study further.
 3. Funds may be needed for some areas.

Page 6, Facilities, First Bullet: USDA should establish a system of laboratories and university based collaborative research centers for investigation, research, and diagnosis of domestic and foreign animal diseases and ectoparasites.

- Response:
1. ARS/APHIS.
 2. Partial implementation will be pursued.
 3. Major fund increase would be required to implement all recommendations. Not likely to be implemented within next 3 to 5 years.
 4. Additional study by both agencies is necessary.

Page 6, Facilities, Second Bullet: Contagious Animal Diseases.

- Response:
1. ARS/APHIS.
 2. Implementation will require substantial study and planning. Feasibility will be assessed by both agencies over next 1 to 2 years.
 3. Implementation will require long-term planning and policy decisions.
 4. Criteria will be developed for relocation of research and diagnostic facilities on the mainland.

Page 7, Facilities, First Bullet: Winged Vectors.

- Response:
1. ARS.
 2. Response is positive.
 3. Implementation will require more funds.
 4. Presently under study.

Page 7, Facilities, Second Bullet: Non-winged Ectoparasite Vectors.

- Response:
1. ARS.
 2. Response is positive.
 3. Additional funds required.
 4. Needs more study.

Page 7, Facilities, Third Bullet: Avian Diseases.

- Response:
1. ARS.
 2. Response is positive.
 3. Additional funds required.
 4. Needs more study.

Page 7, Facilities, Fourth Bullet: A diagnostic services system.

- Response:
1. APHIS.
 2. Response is positive.
 3. Additional funds.
 4. Needs study.

Page 7, Facilities, Fifth Bullet: Production of diagnostic reagents.

- Response:
1. APHIS.
 2. Response is positive.
 3. Additional funds needed.
 4. Needs study.

Page 8, Facilities, First Bullet: University Based Research.

- Response:
1. ARS.
 2. Response favorable.
 3. Increased cooperative research is highly desirable.
Extramural research must continue to be consistent with
research priorities and USDA resources.

Page 8, Research and Diagnosis:

- Response:
1. ARS/APHIS.
 2. Response is positive.
 3. Needs additional funding.
 4. Needs more study.

Page 8, Research and Diagnosis, First Bullet: USDA should increase the knowledge base to anticipate FAD&E threat.

- Response:
1. ARS/APHIS.
 2. Response is positive.
 3. Increased funds needed according to expansion of activities.
 4. Needs more study.

Page 9, Research and Diagnosis, First Bullet: Capabilities for early detection and diagnosis must be improved.

- Response:
1. ARS/APHIS.
 2. Response is favorable.
 3. Increased funding according to expansion of activities in foreign countries or a change in present priorities.
 4. Needs more study.

Page 9, Research and Diagnosis, Second Bullet: Capability to contain FAD&E outbreaks must be improved.

- Response:
1. ARS/APHIS.
 2. Response is favorable.
 3. Implementation can be done without additional funds.

Page 9, Personnel, First Bullet: USDA should use all possible means for effective recruitment, training, and career development of scientific and technical personnel for FAD&E research and diagnosis and for developing scientific expertise in FAD&E.

- Response:
1. ARS/APHIS.
 2. Response is very positive.
 3. Limited implementation can be accomplished without additional funds by increased cooperative efforts by USDA and States.
 4. Needs study for long-range implementation.

Page 9, Personnel, Second Bullet: USDA's FAD&E laboratories should be located at or near universities.

- Response:
1. ARS/APHIS.
 2. Response is favorable.
 3. Related to items on page 6.
 4. Needs more study.

Page 10, Biological Containment, First Bullet: USDA laboratories working with FAD&E should take immediate steps as warranted to ensure safety of procedures, and USDA should authorize new facilities and upgrading of biocontainment in accord with its planning for the FAD&E program and laboratory resources.

- Response:
1. ARS/APHIS.
 2. Response is positive.
 3. Implementation is in progress with hiring of biocontainment officer.
 4. Needs further study and implementation.

Page 10, Biological Containment, Second Bullet: USDA should initiate department-wide biosafety appraisal and biosafety assistance to state veterinary diagnostic laboratories, many of which, in contrast to federal facilities are able to conduct mass screening.

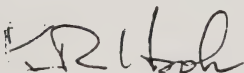
- Response:
1. APHIS.
 2. Response is positive.
 3. Implementation will require additional funds. Funds could come from States and private sector, as well as USDA.
 4. Needs study.

Page 10, Budgets, First Bullet: USDA should review and revise its budgeting to accord with its long-term planning for a more effective FAD&E research and diagnostic program.

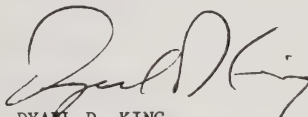
- Response:
1. ARS/APHIS.
 2. Additional consideration will be given to this area.

Long-Term Plan:

- Response:
1. ARS/APHIS.
 2. Response favorable.
 3. Planning will be coordinated with items under page 6 above.



KENNETH R. HOOK
Associate Deputy Administrator
Veterinary Services, APHIS



DYARL D. KING
National Program Director
Animal Protection
National Program Staff, ARS

Long-Term Planning for Research and Diagnosis to Protect U.S. Agriculture from Foreign Animal Diseases and Ectoparasites

Subcommittee on Research and Diagnosis
on Foreign Animal Disease

Committee on Animal Health

Board on Agriculture

National Research Council

National Academy Press
Washington, D.C. 1983

NOTICE

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee and subcommittee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

The National Research Council was established by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and of advising the federal government. The Council operates in accordance with general policies determined by the Academy under the authority of its congressional charter of 1863, which establishes the Academy as a private, nonprofit, self-governing membership corporation. The Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in the conduct of their services to the government, the public, and the scientific and engineering communities. It is administered jointly by both Academies and the Institute of Medicine. The National Academy of Engineering and the Institute of Medicine were established in 1964 and 1970, respectively, under the charter of the National Academy of Sciences.

This study was supported by the U.S. Department of Agriculture.

This report is available from the Board on Agriculture.

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PREFACE

This report follows a request to the National Research Council Board on Agriculture from the U.S. Department of Agriculture (USDA) for assistance in long-range planning for research on and diagnosis of foreign animal diseases and ectoparasites (FAD&E). Objectives of this study were to:

- Assess the current state of the USDA effort on FAD&E diagnosis and research;
- Assess, for three 10-year increments, current and projected technology of biological containment; and
- Assist USDA in planning, in three 10-year increments, for research on and diagnosis of all FAD&E of livestock and poultry; these include viral, bacterial, rickettsial, fungal, and hemoprotozoan diseases and the ticks, mites, parasitic Diptera and other ectoparasites. This plan must address not only scientific aspects as defined in the Agricultural Research Service (ARS) Strategic Plan but also operational considerations such as existing and projected facilities and their locations, scientific and support personnel, equipment, budgets, and necessary renovations. Obviously, for implementation of the plan, efficient administration will strengthen and expand existing facilities and enhance the employment and training of present and additional personnel.

To conduct this study a subcommittee of 11 specialists was formed under the Board on Agriculture's Committee on Animal Health. The first organizational meeting of the subcommittee was held November 18-19, 1982, in Washington, D.C., where it was briefed by agency personnel. Visits were made to major USDA Agricultural Research Service laboratories: National Animal Disease Center, Ames, Iowa, December 13-14, 1982; Arthropod-borne Animal Diseases Research Laboratory, Denver, Colorado, December 15, 1982; Plum Island Animal Disease Center, Greenport, New York, January 25-26, 1983; Metabolism and Radiation Research Laboratory, Fargo, North Dakota, February 8, 1983; Hemoparasitic Diseases Research Unit, Pullman, Washington, February 9, 1983; U.S. Livestock Insects Laboratory, Kerrville, Texas, March 17, 1983; Veterinary Toxicology and Entomology Research Laboratory, College Station, Texas, March 18, 1983; and the Southeast Poultry Research Laboratory, Athens, Georgia, March 22, 1983. The

subcommittee also visited the USDA Animal and Plant Health Inspection Service (APHIS) National Veterinary Services Laboratories, Ames, Iowa, December 13, 1982, and the Iowa State University Veterinary Diagnostic Laboratory, Ames, Iowa, December 14, 1982.

The subcommittee conducted a confidential survey of FAD&E scientists' views about their work, and it tested a questionnaire for evaluation of risk of FAD&E.

To review the technology of biological containment facilities that might apply to FAD&E research, visits were made also to the U.S. Army Medical Research Institute for Infectious Diseases, Fort Detrick, Frederick, Maryland, January 27, 1983, and to the Centers for Disease Control, Atlanta, Georgia, March 23, 1983. Visits were also made to the Australian National Animal Health Laboratory, Geelong, Australia, February 8-11, 1983; and to the New York and Harry S Truman Animal Import Centers. The subcommittee met March 23-24, 1983, in Atlanta, Georgia, to outline its report, and in Washington, D.C., June 21-23, 1983, to review its first draft of the report. During this time the members were able to brief administrators of ARS and APHIS on the progress of the study. The subcommittee met in Woods Hole, Massachusetts, August 29-September 2, 1983, and again in Washington, D.C., October 25-26, 1983. The Committee on Animal Health provided oversight and reviewed the final report of the subcommittee.

The subcommittee wishes to express its appreciation to H. Graham Purchase, ARS, and H. A. McDaniel, APHIS, who were liaison from USDA to the subcommittee and who provided necessary information and documents. Special thanks are also expressed to Ralph Bram, ARS, for providing information on ectoparasites. The subcommittee wishes to express its appreciation to the Committee on Animal Health for its guidance and support during the study and for review of the final draft report. The subcommittee also wishes to thank Werner P. Heuschele, of the San Diego Zoo, E. Hunt McCauley, of Big Timber, Montana, Neville P. Clarke, of Texas A & M University, and John A. Pino, of the Inter-American Development Bank, for their in-depth review of the final report. The subcommittee also wishes to express its gratitude to Philip Ross, Executive Secretary of the Board on Agriculture; to Selma P. Baron, Staff Officer, who provided guidance and support; and to Gerald S. Schatz, Consultant to the subcommittee and editor of this report.

SUMMARY

Animal diseases and ectoparasites take a terrible toll, cutting dramatically into food supplies in the developing and developed countries and disrupting agricultural trade worldwide. The United States has been remarkably free of many of the animal diseases and ectoparasites that do so much harm abroad. If some of the foreign animal diseases and ectoparasites (FAD&E) spread into the United States the costs to protect livestock and public health could run to hundreds of millions of dollars, damage could run to billions of dollars, and costs to consumers could exceed \$10 billion over the years needed to subdue a major outbreak. The industry at risk is one of the country's largest, with livestock and values added by processing totaling \$82.4 billion in 1981, and it is one of the few consistent strengths in U.S. international trade.

Animal diseases endemic to the United States do immense damage; U.S. losses of cattle, sheep, goats, swine, and poultry to arthropod ectoparasites alone now approximate \$3 billion annually. The early estimates of losses from the November 1983 Pennsylvania outbreak of a recently discovered pathotype of avian influenza exceed \$10 million, and there has been concern that costs could be multiplied many times if the disease were to spread south to the concentrated poultry industry in the Delaware-Maryland-Virginia peninsula.

This country has been protected from FAD&E by geography, research investment, and vigilance. We have been fortunate.

The U.S. Department of Agriculture (USDA) is preparing a 30-year plan to strengthen its FAD&E research base and diagnostic capability. This report follows a study by a subcommittee of the National Research Council Board on Agriculture's Committee on Animal Health to assist USDA in appraising current FAD&E research, biocontainment, and diagnosis and in long-range planning. This study addressed only issues concerning planning for research and diagnostic capability; it did not directly address the regulatory and operational problems of disease prevention, control, and eradication.

Chapter 1 describes the problem as brought to the subcommittee by USDA and explores issues in planning for science.

U.S. DEPARTMENT OF AGRICULTURE'S MISSION

The fundamental responsibility for FAD&E research, diagnosis, regulation, control, and eradication, as well as domestic animal

diseases, is assigned by Congress to USDA. There is related biological research supported by a variety of agencies and the livestock industry.

Within USDA, the responsibility for FAD&E research is assigned to the Agricultural Research Service (ARS), which until this year was assigned responsibility also for FAD&E diagnosis. The Animal and Plant Health Inspection Service (APHIS) now is responsible for diagnosis of foreign as well as domestic animal diseases and ectoparasites. ARS is the department's primary intramural research arm; its work includes supportive research for APHIS programs.

The law bars importation of live virus of foot-and-mouth disease (FMD) except for research at an island unconnected to the U.S. mainland. In consequence, USDA has concentrated most of its FAD&E work at its isolated Plum Island Animal Disease Center (PIADC), off the coast of Long Island.

The USDA mandate, current ARS planning, and ARS and APHIS laboratories engaged in FAD&E work are described in Chapter 2.

THREAT AND CONSEQUENCES OF FOREIGN ANIMAL DISEASES AND ECTOPARASITES

USDA is aware of the threat and possible scale of consequences of a U.S. outbreak of FAD&E and has sponsored research into these questions. Nevertheless, there are scant data on which to base judgments. The industry and export markets at risk are huge, and the damage potential, as noted above, is in the hundreds of millions, possibly in the billions, of dollars.

Nor is it easy to assess the threat. International air travel, smuggling, the pending completion of the Pan American Highway, the disruption of animal-disease surveillance and control programs in other countries, changing travel and trade and changing transportation patterns of people and animals in the United States and in other countries, the intensification and vast diversity of animal-management practices, winds, wildlife migrations, vector movements, contamination of transported objects, and the possibility of accident all are among factors that can influence the arrival and spread of FAD&E in the United States. Problems in U.S. interagency cooperation and weaknesses in research and diagnosis exacerbate the hazard.

Consequences of an outbreak of FAD&E in the United States could include:

- Lower farm productivity;
- Increased production costs from inefficiency and control expense;
- Increased farm-financing costs;
- Increased prices to consumers;
- Reduced export markets;
- Interstate-marketing restrictions; and
- Hazard to human health, wildlife, and the natural environment both from the disease and from control measures.

Estimation of economic impact in the absence of experience is difficult. The numbers are inherently unreliable. To imagine the worst case is easy but insufficient. A sense of what probably can be expected provides a better basis for assessment of priorities for FAD&E research and diagnostic capability. All these diseases pose substantial threats, but they differ in their hazards to human health and the economy.

The estimates available to this subcommittee show a net total benefit of \$12 billion for keeping FMD out of the country. Cost to control a modest outbreak of FMD would be \$54 million, but there are studies that put that figure at \$539 million and at \$690 million. The benefit of keeping African swine fever (ASF) out of the United States has been estimated at \$5 billion. The cost (in 1981 dollars) to eradicate a small ASF outbreak similar to the 1976 New Jersey hog cholera experience has been estimated at \$11.6 million, and the eradication cost of a multi-state ASF outbreak has been estimated at more than \$152 million. An uncomplicated repetition of California's early-1970s experience with viscerotropic velogenic Newcastle disease (VWND) probably would cost \$97 million to eradicate today. A repetition of Mexico's 1946-1954 FMD epidemic could cost \$404 million to eradicate today; the United States necessarily is involved when that kind of disease nears its borders, and it shares an interest with its neighboring countries in surveillance and control of diseases and disease vectors.

A worst-case argument would estimate the export cost of VWND at \$550 million, for ASF and swine vesicular disease (SVD) at \$300 million each, and for FMD at \$1 billion. VWND might have negligible impact on exports unless the outbreak were catastrophic in heavily concentrated poultry areas such as those of Alabama and Georgia. European experience suggests that FMD outbreaks can be small and contained rapidly, so export losses might be far less than the worst-case estimate. But other countries' experiences with ASF and SVD indicate that the United States would be fortunate in controlling and eradicating either disease swiftly.

Planning for FAD&E research and diagnosis must take account of risk assessment that includes appraisal of likelihood of disease and vector introduction; institutional and technological vulnerability; susceptibility of the animal population; and impact of the disease on human health, livestock, and the economy.

Assessment and management of the risks of FAD&E outbreaks are examined in detail in Chapter 3. These are issues to be taken into account in planning for FAD&E research and diagnosis.

CURRENT RESEARCH AND DIAGNOSIS

FAD&E work has been among the topical areas set forth in ARS program planning, and ARS has developed a six-year research plan and implementation strategy that include as a goal the development of ways to minimize losses to animal diseases.

As noted, most of the department's FAD&E work, including all its live-virus FMD study, is at Plum Island. Other ARS and APHIS laboratories also work on FAD&E; a small percentage of the FAD&E research supported by USDA is conducted by universities.

It is because of USDA's concern that the entire FAD&E research and diagnostic effort be strengthened that this subcommittee undertook its study. The department's FAD&E research and diagnostic development have not been subject to periodic, external scientific evaluation. The subcommittee found widespread weaknesses.

Except for the Secretary of Agriculture there is no central USDA authority for specific management and oversight of FAD&E research and diagnosis. USDA's current FAD&E research and diagnostic development do not reflect a cohesive, effective national program. Objectives are not clear. The existing knowledge base, the state of several laboratories, and the current level of diagnostic capability are inadequate. Few U.S. scientists are familiar with these diseases and their vectors. The subcommittee is concerned that FAD&E work may not be adequately in touch with current developments in biomedical science and that diagnostic development may be cut off from direct contact with research. Fewer than half of the more than 40 foreign animal diseases now or potentially threatening the United States are under USDA study. Biosafety containment for FAD&E research is not up to standard. The several USDA laboratories involved in FAD&E research and diagnosis vary widely in facilities, productivity, and scientific quality. As a whole, the current effort is unfocused, understaffed, and underfunded.

The subcommittee's assessment of the USDA research and diagnostic effort is described in Chapter 4; biosafety is examined in Chapter 5 and Appendixes A-L.

LONG-TERM STRATEGIES

The starting point for the department's 30-year plan should be the need to remedy deficiencies in science, personnel policies, facilities, and administration. To make a decision on facilities and then match a science program to it would be unlikely to yield an appropriately balanced, high-quality science program. To plan for research without regard for facilities would be unrealistic. A program without provision for recruitment and retention of qualified scientists would be equally unrealistic.

The program goal is to strengthen research and diagnosis to minimize U.S. vulnerability to FAD&E. The subcommittee proposes a planning framework (see Chapter 6) to strengthen U.S. capability for FAD&E research at home and abroad and to expand international co-operation and training, fostering worldwide ability to control animal diseases and ectoparasites.

An effective strategy for research and diagnosis requires objectives and actions on administration, the research-and-diagnosis program, personnel, facilities, and budgets, and it requires that planning be for science, not of science. Planning to foster needed FAD&E research

and diagnostic capability cannot be an isolated, one-time effort.

- Strategic plans for FAD&E research and diagnosis must be reviewed at least every three years by USDA, by FAD&E specialists, and by the wider biomedical science community and must be revised as developments warrant.

The subcommittee's approach to strategic planning is discussed in Chapter 1, and recommendations for planning are set forth in detail in Chapter 6. Major recommendations in each planning category are synopsized below.

Administration

National responsibility for FAD&E research and diagnosis is divided between two USDA agencies--ARS and APHIS. Close coordination is essential. Coordination is also necessary with domestic and foreign institutions.

- USDA should appoint an FAD&E program director responsible directly to the Administrators of both ARS and APHIS for FAD&E research, investigation, and diagnosis. The director should be delegated the authority for timely, responsive management of all USDA and contractual resources available for FAD&E investigation, research, and diagnosis.
- USDA should work toward integration of its animal-health activities into a single manager service. Efficiency and effectiveness require consolidation of USDA's animal health resources into a single service, responsibilities of which would include domestic and foreign animal diseases and ectoparasites. The service would draw on its own research resources and those elsewhere in USDA and in the larger scientific and engineering community.
- USDA should increase coordination with other federal agencies and foreign institutions. The subcommittee urges greater utilization of those domestic and foreign institutional resources that can expand our capacity for FAD&E investigation, research, and diagnosis. Cooperation with foreign and international institutions where animal diseases and ectoparasites of interest to the United States are endemic helps to control spread of diseases and provide opportunities for firsthand training.

Facilities

Categorical disease investigation, research, and diagnostic method development research for FAD&E is scattered through the current USDA laboratories.

- USDA should establish a system of laboratories and university based collaborative research centers for investigation, research, and diagnosis of domestic and foreign animal diseases and ectoparasites. In some instances this will require upgrading of current laboratories; in others it will require relocation, consolidation, or new facilities. Some overlap is inevitable and useful, but the distinctive missions of each laboratory should be clear. Each FAD&E laboratory should provide for multidisciplinary basic and applied team research in molecular biology, epidemiology, pathogenesis, host response, and diagnostic methods. The FAD&E laboratory system should provide for:
- Contagious Animal Diseases. An effective FAD&E research program requires a major laboratory--with high biological containment, a clear mission, and strong science--as its principal center for the study of exotic airborne and fomites-transmitted non-avian animal diseases. Plum Island Animal Disease Center (PIADC), which meets the current statutory requirement for island isolation of live-agent FMD work, has been undergoing renovation, has facilities for large animal challenges, and is the only practical near-term choice for such a research center. The subcommittee believes that because of the isolation and exceptionally high costs (see Chapter 4) which its location imposes, and because of advances in biocontainment (see Chapter 5), Plum Island is not an adequate long-term site for such a laboratory. PIADC should be strengthened to function in the interim as USDA's principal center for study of exotic airborne and fomites-transmitted non-avian animal diseases. Planning should begin immediately for (1) establishment of a highly secure, advanced, mainland laboratory to which PIADC's functions as a contagious animal-disease laboratory would be relocated, and (2) conversion of PIADC thereafter to function as a scientific support and test facility for large animal challenges and vaccine studies. The subcommittee believes that large animal challenges for FMD are best retained at Plum Island, as an extra safeguard, but points out that changes in the law will be necessary nonetheless to permit live FMD laboratory research even in high containment facilities on the mainland. As soon as possible, USDA should proceed with construction of a new, highly secure, mainland laboratory to succeed PIADC as USDA's principal center for research on exotic airborne and fomites-transmitted non-avian animal diseases. The new laboratory should include small animal facilities, must be able to operate at Biosafety Containment Level 4 (maximum containment), and must include the most modern developments in biocontainment technology, to ensure the maximum possible protection of U.S. livestock from exotic infectious agents under study. The laboratory should be close to a major airport and near a major university campus to ensure ready access and a supportive scientific environment. With completion of the new contagious-diseases laboratory, PIADC

should be converted to a scientific support and test facility for large animal challenges and vaccine studies. The subcommittee believes that large animal challenges for FMD should continue to be retained at Plum Island. If it is impossible to obtain the legislative changes necessary to permit live agent FMD research and diagnostic activity--except for farm animal experimentation, which would remain at Plum Island--on the mainland then obviously the only alternative is to keep the FMD live agent work at Plum Island. While PIADC can and must be strengthened to serve as an interim center for study of exotic, contagious animal diseases, its isolation and high costs of operation, construction, and maintenance make it unsustainable for the long term. The subcommittee is firmly convinced that continued concentration at Plum Island of most of the national FAD&E effort is unwarranted and that PIADC's work, including live FMD studies other than large animal challenges, must be moved to a well-planned laboratory on the mainland.

- Winged Vectors. The FAD&E research system needs a new laboratory with sufficient biological containment facilities to study winged vectors and the diseases they carry. This laboratory should study exotic and endemic diseases of livestock.
- Non-winged Ectoparasite Vectors. USDA's intramural research on all ectoparasite vectors and the diseases they carry should be located at a single facility, with appropriate biocontainment. This laboratory's work should include study of exotic and endemic diseases.
- Avian Diseases. USDA's intramural research on exotic and endemic avian diseases should be located at one facility with sufficient biocontainment and equipment for simulation of poultry industry environments.
- A diagnostic services system. USDA needs an FAD&E diagnostic center with reagent production capabilities. This center would be the focal point (1) for diagnostic services through cooperative agreements with state veterinary diagnostic laboratories and (2) for diagnostic development research in the FAD&E research laboratories. Expanded diagnostic research cooperation with the state diagnostic laboratories, any of which may encounter exotic diseases and ectoparasites before these come to federal attention, is essential.
- Production of diagnostic reagents. There is limited industrial interest in production of biologics (e.g., vaccines, antigens, antitoxins, antibodies) for FAD. USDA must have immediate access to biologics production facilities in emergencies. USDA should consider one or more of the following courses to establish needed advanced technology

biologics production capability: (1) Arrange for a contractor operated facility, which need not be government owned; (2) Arrange for such a facility in partnership with the U.S. Department of Defense; (3) Establish agreements for such services from foreign biologics producers; (4) Develop USDA biologics production facilities.

- University Based Research. USDA should contract for university operation of uniquely valuable, currently available facilities and use special expertise of university scientists to provide flexibility and scientific balance for the FAD&E program. USDA should expand its university research relationships in the fields of FAD&E and related science.

Research and Diagnosis

Basic and applied research both are required, but trying to establish a boundary between the two is not helpful. Excellent basic research is done often with applications in mind; a balanced science program with a purpose needs targeted and untargeted but related research. The program should include epidemiology and economics; etiology; and immunology and physiopathology. Each FAD&E laboratory, as noted earlier in the discussion of facilities, should have multidiscipline teams working on basic and applied research in molecular biology, epidemiology, pathogenesis, host response, and diagnostic methods. Research and diagnosis should not be isolated from each other.

Throughout the 30 years covered in this planning framework, fundamental studies are required in: (1) biology of pathogens and parasites of exotic origin; (2) the nature of host parasite interaction of these pathogens and parasites with important host species; (3) epidemiology of all of the pathogens and parasites of exotic origin wherever they occur; and (4) the changing ecology for parasites and pathogens of livestock and poultry in U.S. production and marketing procedures.

Throughout these 30 years also, applied studies are required to: (1) develop improved methods for early detection and diagnosis of FAD&E; (2) develop methods for control or elimination of FAD&E; (3) develop methods for disposal of FAD&E-contaminated wastes; (4) establish a scientific basis for FAD&E risk assessment; and (5) evaluate strategies for FAD&E risk management.

How all these needs are addressed depends upon the evolution of science and technology, on availability of advanced facilities, on development of scientific and technical competence, on program organization and administration, on budgets, and on the changing nature of the FAD&E threat.

- USDA should increase the knowledge base to anticipate FAD&E threat. Studies are required to expand epidemiologic and

economic understanding of FAD&E; to develop FAD&E risk assessment; to understand the pathogenesis, immunology, and transmission of FAD&E; and to understand the relationships of FAD&E and agroecology, including production and marketing.

- Capabilities for early detection and diagnosis must be improved. Better diagnosis requires improved technology for use with the tests currently available; research on new biotechnologies of potential diagnostic value; strengthening of animal disease diagnostic research and development abroad; and strengthening of disease surveillance and diagnostic training.
- Capability to contain FAD&E outbreaks must be improved. Adequate containment methods must be developed, and acceptable methods are needed for salvage and disposal.

Personnel

The United States has too few experienced, outstanding FAD&E scientists. USDA has not attracted enough young, well-trained talent. USDA must recruit and retain highly qualified and productive FAD&E scientists.

- USDA should use all possible means for effective recruitment, training, and career development of scientific and technical personnel for FAD&E research and diagnosis and for developing scientific expertise in FAD&E. USDA can help build an adequate U.S. scientific base for FAD&E research and diagnosis by fellowships, internships, exchanges, other professional development programs, and support of university-based research.
- USDA's FAD&E laboratories should be located at or near universities. Siting laboratories at or near universities provides: (1) interchange of scientific ideas among USDA and university scientists; (2) recruitment of competent young scientists, who are attracted to a university setting; (3) availability of postdoctoral scientists for research and training; (4) availability of technicians and support personnel; and (5) availability of libraries and other scientific resources.

Biological Containment

Equipment and procedures have been developed for research with highly hazardous biological agents. USDA can plan its FAD&E program and laboratory resources knowing that biocontainment in most instances (work with FMD and live FMD virus is confined by law to an island facility) need not be an insurmountable problem. Development of high-level biocontainment facilities, particularly those at Biosafety Containment Level 4, should be considered carefully: (1) There is no

evident need for an array of such facilities. (2) Costs of construction, maintenance, and operation are high. (3) Operating constraints would impose excessive costs on conducting research that could be done safely at lesser containment. Most USDA laboratories working on FAD&E are equipped inadequately for biocontainment, and enforcement of safety procedures is uneven (see Chapter 5 and Appendixes A-I).

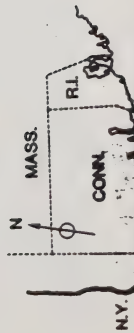
- USDA laboratories working with FAD&E should take immediate steps as warranted to ensure safety of procedures, and USDA should authorize new facilities and upgrading of biocontainment in accord with its planning for the FAD&E program and laboratory resources.
- USDA should initiate department-wide biosafety appraisal and biosafety assistance to state veterinary diagnostic laboratories, many of which, in contrast to federal facilities, are able to conduct mass screening.

Budgets

Current and recently projected USDA budgeting will not meet the needs of an adequate research and diagnostic program.

- USDA should review and revise its budgeting to accord with its long-term planning for a more effective FAD&E research and diagnostic program.

The Plum Island Animal Disease Center



1. Lighthouse overlooking Long Island Sound and Plum Gut.
2. The PIADC Sewage Treatment facility.
3. The research laboratory complex (Buildings 101, 102, 103).
4. Administrative buildings and support services.
5. Large Animal Supply and quarantine area.
6. The Diagnostic Laboratory (Building 257).
7. Plum Island harbor and warehouse complex.



The Plum Island Animal Disease Center

The Plum Island Animal Disease Center is a diagnostic and research facility devoted to preventing foreign diseases of animals from endangering the livestock population of the United States. The Center is part of the Agricultural Research Service of the U.S. Department of Agriculture (USDA). It is located on an island east of Long Island, N.Y., a site chosen to minimize the possible escape of foreign animal disease agents to the U.S. mainland.

Threats of outbreaks of foreign animal diseases in the United States, with potential risks that they might become established in the country, have increased in recent years as man and animals continue to move across international borders in ever-increasing numbers. Modern rapid transportation has increased the potential for the spread of diseases among countries.



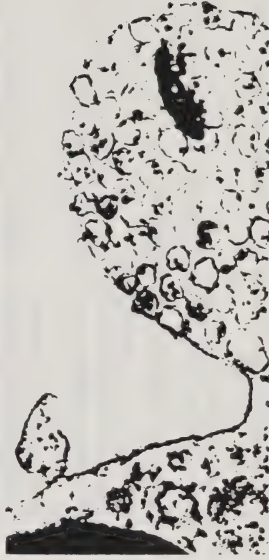
The fundamental mission of the PLADC is to help keep U.S. livestock, such as these baby pigs, free of foreign animal diseases. The Center is a national laboratory dedicated to solving international veterinary problems. Healthy animals used in the Center's diagnostic and research programs contribute ultimately to maintaining the health of animals throughout the United States and the rest of the world.



This scanning electron micrograph shows the erosive effect of foot-and-mouth disease virus three days after being injected into the tongue of a guinea pig.

The livestock population of the United States is susceptible to foreign diseases, such as foot-and-mouth disease and African swine fever. Diseases such as these must be guarded against with every available means, and the efforts of the Center are directed to keeping our livestock safe from the economic catastrophe that would result should an outbreak occur.

Thus, the Plum Island Animal Disease Center is responsible for (1) developing diagnostic capabilities for animal diseases that are foreign to the United States, (2) conducting a wide range of research endeavors on the causative agents of these diseases, and (3) developing procedures for the safe importation of animals and animal products.



A cell containing the rickettsia that causes a disease known as heartwater is shown in this transmission electron micrograph.

Diagnosis

- Studied the susceptibility of white-tailed deer and other animal species to various foreign animal diseases to determine the possible threat of these diseases to U.S. wildlife.
- Measured the immune response of American sheep and cattle to inactivated Rift Valley fever vaccine.
- Developed the hemadsorption reaction test and other sensitive tests for the diagnosis of African swine fever.
- Developed diagnostic procedures for approximately 40 foreign animal diseases.
- Isolated the virus causing duck plague and developed a vaccine that was adopted by the duck industry.
- Established the serological relationship between the orbiviruses causing Ibaraki and epizootic hemorrhagic fever diseases.
- Defined the serological relationship between swine vesicular disease virus and human Cocksackie B₅ virus, and found that the central nervous systems of pigs infected with either virus were similarly involved.
- Visualized the external structure of many foreign animal disease viruses by electron microscopy for diagnostic purposes.
- Demonstrated in cooperation with scientists elsewhere that new types of influenza virus can be isolated from swine, chickens, and turkeys infected simultaneously with two different influenza viruses.
- Diagnosed, for the first time, African swine fever in Brazil, the Dominican Republic, and Haiti.
- Developed a tissue culture plaque assay for FMD virus and its infectious RNA.

Molecular Biology of Foot-and-Mouth Disease Virus

- Demonstrated many physical and chemical properties of the virus necessary for understanding its biochemical nature.
- Determined the amino acid composition of virus proteins VP₁, VP₂, and VP₃ and demonstrated that the VP₃ capsid protein was immunogenic.
- Isolated a viral-specific double-stranded form of viral RNA.
- Demonstrated that capsid proteins are phosphorylated and that the virus contains a protein kinase.
- Isolated and characterized the RNA polymerase of the virus.
- Cloned VP₃ in *E. coli* K-12 and immunized livestock with the product.

Vaccines for Foot-and-Mouth Disease Virus

- Established a procedure for the production and purification of milligram amounts of virus from tissue culture cells, a technique necessary for biochemical and immunological studies.
- Developed methods for destroying the infectivity of the virus without destroying its immunogenicity so that whole virus vaccines can be produced.
- Developed an inactivated whole virus vaccine for cattle that was emulsified with oil adjuvant, and found that this vaccine was equally effective in swine.
- Developed a rapid method to concentrate the virus that permits the inactivated antigen to be stored for years in the gaseous phase of liquid nitrogen.

Transmission of Foot-and-Mouth Disease

- Found that the virus in bull semen could be responsible for the transmission of the disease.
- Followed the growth of the virus in the upper respiratory tract of nonimmunized, vaccinated, and recovered cattle after intranasal inoculation of virulent virus to determine how such animals might become reservoirs of infectious virus.

RESPONSES TO THE STUDY BY THE NATIONAL
ACADEMY OF SCIENCES (NAS) ON LONG TERM PLANNING
TO PROTECT US AGRICULTURE AGAINST
FOREIGN ANIMAL DISEASES AND ECTOPARASITES

Roger G. Breeze
Center Director
Plum Island Animal Disease Center

Abstract

In 1983, the NAS recommended that the Plum Island Animal Disease Center (PIADC) be moved to a mainland location near a major university because strong science could not be done at the current isolated site, especially since research funds were drained by high overhead costs of the island's operations and there were substantial facilities deficiencies.

I have never believed that a new mainland laboratory to replace PIADC was a realistic option. The challenge has always been to make the Center operate where the Congress put it. In the past 2 years we have made major changes:

- focussed the research programs on new objectives;
- restaffed science programs to meet new objectives;
- provided major scientific equipment;
- renovated facilities;
- purchased a new ferry boat;
- implemented new ferry service to Connecticut;
- implemented collaborations with local universities (U Conn, SUNY, Yale);
- established new cost sharing agreements between ARS and APHIS; reduced overhead costs significantly and identified further overhead cost reductions achievable in the next 3 years;
- developed a Facilities Consolidation plan which will be complete by Summer 1993; and
- begun a detailed inventory of needed facilities/major equipment improvements.

As a result of these changes, it is clear that strong science can be done at PIADC and it is not necessary or desirable to move the Center to the mainland. However, there are major facilities needs that are unavoidable and which will cost as much as \$40-50 million. Only a Congressional appropriation can provide these funds.

The NAS Study Group, which visited the Plum Island Animal Disease Center in January 1983, declared that:

"An effective Foreign Animal Disease and Ectoparasite Research Program requires a major laboratory - with high biological containment, a clear mission and strong science - as its principal center for the study of exotic airborne and fomites-transmitted non-avian animal diseases."

They concluded that:

"Planning should begin immediately for:

- 1) establishment of a highly secure, advanced, mainland laboratory to which PIADC's functions as a contagious animal disease laboratory would be relocated; and*
- 2) conversion of PIADC thereafter to function as a scientific support and test facility for large animal challenges and vaccine studies.*

The laboratory should be close to a major airport and near a major university campus to ensure ready access and a supportive scientific environment."

The most modern Foreign Animal Disease (FAD) Laboratory in the world is the Australian Animal Health Laboratory which opened in 1986 at Geelong, on the Australian mainland. This facility cost about (Australian) \$160,000,000 (US \$200,000,000) to construct and it took 10 years from appropriation of funds to opening day. Australian animal commodity groups have never accepted government assurances on the adequacy of biocontainment practices at the laboratory and have steadfastly opposed introduction of live exotic agents such as foot-and-mouth disease. Lapses since 1986 in biosafety protocols have encouraged commodity opposition. To date, the Laboratory has not worked with live foot-and-mouth disease, African swine fever, and other foreign animal disease agents.

Before I became PIADC Director in July 1987, I reviewed the NAS Report and Recommendations.

I eliminated as a practical plan the idea that PIADC could be entirely relocated to a new mainland site with research laboratories and animal facilities, for the following reasons:

1. An Act of Congress would be required.
2. The new facility would cost at least \$400,000,000.
3. It would take 10 years to appropriate funds, obtain planning permission, design and build.

4. A mainland site would likely be strongly opposed by commodity groups and by antivivisectionists, environmentalists, foes of genetic engineering and those suspicious of "biological defense" (evidence - US Army Lab expansion at Dugmore Proving Ground).
5. Location of the mainland laboratory would likely not be the choice of USDA or NAS, but be a political decision that could place a new lab in an unfavorable geographic and intellectual environment (e.g., Nevada desert).
6. Substantial and immediate facilities improvements at PIADC could not be avoided for 10 years - and if these improvements were made, the necessity for a new laboratory would be questionable.

I also eliminated as a practical plan the idea that the research laboratories at PIADC could be relocated to a new mainland site or sites with the animal facilities remaining on Plum Island, and for the following reasons:

1. An Act of Congress would be required.
2. There are no available P4 high containment laboratories at Universities or elsewhere, so new construction at one or more sites would be needed and would cost about \$100,000,000.
3. It would be a minimum 4 to 5 years before the new laboratory was ready.
4. A mainland site for a laboratory with live foreign animal disease agents would be opposed by various groups as outlined above.
5. The mainland laboratory location would be a political decision.
6. Need for PIADC improvements could not be avoided.
7. The support costs of operating both animal facilities at PIADC and a new laboratory on the mainland would exceed current costs of operating PIADC as a whole at Plum Island, so the actual money available for research would be reduced. Research funds would be reduced even more if the work were performed by university scientists since at least 10% administrative overhead would be charged by the institutions. Without additional Congressional appropriations, this option would greatly reduce operating research funds.

I fully endorsed the NAS statement that:

"An effective FAD&E research program requires a major laboratory - with high biological containment, a clear mission and strong science - as its principal center for the study of exotic airborne and fomites-transmitted non-avian animal diseases."

However, in accepting the position as Center Director, I came to different conclusions from the same facts laid out by NAS, namely:

1. That the major laboratory with high biological containment, clear mission and strong science could only be at Plum Island.
2. That the essential biological containment, clear mission and strong science could be established at Plum Island within the existing budget, within three years and without additional Congressional appropriations.

I was wrong only in that additional Congressional appropriations will be necessary to correct unforeseen facilities deficiencies. Below, I address what has been done in the past two years to develop a clear mission, strong science and high biological containment and also outline our plans for the future.

The Mission of Plum Island Animal Disease Center

It is understandable that there should be some confusion over the purposes of PIADC when our program deals solely with diseases that don't occur in the US, which for the most part have not occurred here in 50 years or more, and for which the stated policy of the regulatory authority is eradication by slaughter if they should occur in the US - a method proven effective over 100 years.

But in fact, the mission of PIADC is, and always has been, very clear: *To protect US animal industries and our exports from economic losses caused by foreign animal diseases.* This mission is not something that the Federal Government can hand piecemeal to universities or contractors - a strong central Federal laboratory is essential to meet ARS and APHIS mandates.

In the next decade, PIADC's mission can best be fulfilled by:

1. *Developing foreign animal disease vaccines that can be manufactured legally in the US by a US manufacturer for use in the US by APHIS in an emergency and for sale abroad.*

Under current law, such vaccines cannot be whole virus and, consequently, we are focussing on recombinant DNA (rDNA) methodology (genetic engineering) in which only a part of the virus is found in the vaccine. Plum Island Animal Disease Center scientists, led by Howard Bachrach, in conjunction with Genentech Inc., developed the world's first rDNA subunit vaccine (for FMDV) in 1981.

2. *Developing new rDNA diagnostic tests that can differentiate between antibodies in vaccinated animals and those in animals that have recovered from infection with the virulent organism.*
3. *Developing new diagnostic tests that will detect foreign animal disease agents more quickly and more sensitively than current technology and that can be used in the field.*

4. *Developing antiviral drugs that will halt a disease epidemic and prevent the need for slaughter of in-contact normal animals.*
5. *Developing transgenic, disease-resistant animals that are unaffected by specific viral diseases, including FMDV and ASF. These animals could be exported by US breeders.*

In order to fulfill any of the goals above, we must create at PIADC the kind of scientific environment that can attract high-quality, well-trained biomedical scientists capable of conducting productive research. We need to re-staff with active researchers in the following areas: virology, immunology, pathology, molecular genetics, biochemistry, and molecular biology - exactly the kinds of people being sought today by most universities and biomedical research labs nationwide. Plum Island Animal Disease Center cannot succeed in competitive recruiting against these other organizations without a strong science program and good facilities. Critical to developing strong science is to stop doing only what we think we can do because of limitations of people, equipment and facilities and instead to determine what needs to be done, then do it!

Elements of a Strong FAD&E Science Program

The NAS identified deficiencies in Science, Facilities, Personnel (recruitment and retention), Research funding and Administration. Of these, Science is by far the most important.

Good scientists are looking for various things in research positions:

- 1) an exciting scientific challenge with an opportunity to make a reputation worldwide;
- 2) adequate research funding with some guarantee of continuity;
- 3) state-of-the-art equipment;
- 4) readily available postdoctoral fellows/graduate students (more easily attracted to an institution with an excellent reputation);
- 5) trained/skilled technical support staff;
- 6) a stimulating intellectual and cultural environment at work and in the community;
- 7) good laboratory/library/office facilities; and
- 8) for animal disease researchers, first class animal facilities.

I firmly believe that the 8 criteria above are far more important than salary, local cost of living and house prices - otherwise Los Angeles, San Francisco,

Boston and Washington could not sustain the world's leading laboratories in so many disciplines.

The first priority at PIADC was to create a scientific research mission equaling the very best work in animal disease anywhere in the world and to sharpen the distinction between working at PIADC and working on animal diseases at a university or competing location in the US. If these could be achieved, I was confident we could overcome other unavoidable negatives (low Federal salaries, high cost of living, high house prices) associated with PIADC. If these could not be achieved, good scientists would be crazy to come to PIADC even if salaries were high and costs were low. This strategy does not deny the importance of salary and local cost of living - there is no doubt that a 25% local cost of living adjustment to Federal salaries would make an enormous difference - it just acknowledges that such an action is not within the power of ARS/APHIS.

Creating stronger science at PIADC within the existing budget demanded that we focus on the most important foreign animal diseases and then on the most important aspects within those diseases.

In a separate document "Research Plan for Plum Island" (enclosed in this briefing book under Tab 3, Day 2), I triaged the numerous foreign animal diseases as follows:

Group 1. Very important agents demanding highly creative research:

Viruses: *Foot-and-mouth (FMD), African swine fever (ASF),
African horsesickness (AHS), hog cholera (HC),
bluetongue (BT).*

Rickettsia: *African heartwater*

Group 2. Important diseases where known new technology might quickly produce effective recombinant DNA (rDNA) vaccines:

Mycoplasmas: *Contagious bovine pleuropneumonia, contagious caprine pleuropneumonia, contagious agalactia of sheep and goats.*

Viruses: *Rinderpest, pest of small ruminants, sheep and goat pox, Rift Valley fever, Venezuelan equine encephalitis, Japanese encephalitis, Nairobi sheep disease.*

Group 3. Important diseases which are being well researched by other countries/institutions:

Only bovine spongiform encephalopathy has immediate interest for PIADC.

Group 4. Foreign animal diseases of lesser importance:

No research planned unless world situation begins to change.

We plan to have about 40% of our research funds in FMD, 40% in ASF/HC and 20% in shorter term projects of high immediate impact in Groups 1 and 2. The goals outlined in the mission statement above - molecular vaccines/diagnostics, antiviral drugs and disease resistant animals - applied to some of the world's most important animal diseases, offer an exciting scientific challenge for any ambitious scientist.

The next priority was to provide adequate research funds and state-of-the-art equipment sufficient to achieve these mission goals, and, specifically, to provide better resources than those available to our competition - successful researchers in animal disease in the universities. The total core program envisaged would have a small number of PIADC career scientists (10) supported by a small number of permanent career technicians (10-15) and a large number of temporary postdoctoral fellows, graduate students, visiting/sabbatical scientists (40-50). These personnel would work in modern, well-equipped laboratories and be supported by highly-specialized equipment - such as nucleotide/peptide synthesis, protein sequencing, X-ray crystallography, fluorescence activated cell sorter, monoclonal antibody facilities - which are essential for the new mission but not available at the Center. Additional funding to provide these has been found by: closing less promising areas of research, removing unproductive scientists and technical staff, and reducing costs in Animal Care, Safety, Lab Services, Administration, Engineering and Plant Management - largely by personnel reductions and increased efficiencies in operations.

By the end of FY-90, we will have virtually completed the re-equipping of the laboratories. In FY-90, individual research projects will be better funded than ever and the NAS criticisms on research funding and equipment will have been answered. Further reductions in indirect support costs in Engineering and Plant Management will occur by the end of FY-90 as a result of staff reductions and economies identified by Ernie Escarcega and in FY-93 we expect more reductions after Facilities Consolidation (see later). In FY-94, the Center will have the maximum possible science within the current budget and the total core program will be in place.

Equipment and research resources are no use without original thinkers to use them. It was immediately clear on coming to PIADC: (1) that until Federal salaries and benefits were substantially improved, we should not expect to retain new scientists longer than about 5 years; (2) that highly trained technical staff, postdoctoral fellows and graduate students competent in today's technologies would have to be hired in large numbers if the research plan were to succeed; and (3) that we could not recruit professional and key administrative employees in sufficient number with only Eastern Long Island as a source.

Therefore, in Fall 1988 we ordered a new vessel, the J. J. CALLIS, and began daily ferry service to Old Saybrook, CT, on May 1, 1989. Recognizing that PIADC could not be relocated close to a university, as the NAS recommended, we brought the local universities closer to us. We are establishing relations typical of other ARS locations (graduate students, special equipment/services/personnel support) with the University of Connecticut (U Conn) and Yale (we have had relations with Tufts and the State University of New York [SUNY] at Stony Brook for some years). We will have lab space in U Conn at Storrs on October 1, 1989 and this will be used for work that does not involve live foreign animal disease agents.

Maximizing our local commuting area on Long Island and in Connecticut offers current and potential employees the widest possible choice of living and cultural environment and places PIADC firmly in the very powerful Northeast Science Corridor which stretches from Washington to Boston. The Connecticut ferry has been very important in changing perceptions of PIADC around the country and we expect that it will end the intellectual isolation, increase professional recruitment and retention, provide a supportive scientific environment, facilitate interchange of ideas and increase the availability of library and other resources. Plum Island Animal Disease Center is now close to five major airports (Newark, LaGuardia, J. F. Kennedy, Islip and Hartford) and near three major university campuses - there is ready access and a supportive scientific environment. Each university is strong in different ways and the combination offers greater opportunities than almost any other location in the United States.

Plum Island Animal Disease Center career scientists will be graduate faculty members at any or all of: SUNY, Yale and U Conn. We believe these opportunities will be very strong motives for competent young scientists to join PIADC. In addition, we will continue to collaborate with strong groups in the US and abroad - in the next year or two this will likely include: Purdue University, the University of Nebraska, University of California at Davis, Tufts, Universities of Madrid and Lisbon, the International Trypanotolerance Center in The Gambia, and government labs in Britain, Australia, Spain, Portugal and Switzerland.

High Biological Containment

The issue of biological containment cannot be separated from overall facilities problems at PIADC. Just because the physical plant is mostly 35 years old or older does not automatically mean that it is inadequate or beyond correction. Enhanced biocontainment methods, more energy efficient machinery and labor-saving automated controls are constantly being introduced and so facilities modernization is ongoing. The underlying problem at PIADC is not today's lack of adequate facilities but the process that led to the current situation.

From opening day, PIADC did not have a full complement of buildings and major support machinery - the \$25 million request for construction was cut to \$10

million. The annual Congressional appropriation for PIADC operations, like all other ARS locations, is intended to meet the needs of science and science support, including operation and repair of facilities and major equipment. But PIADC is unusual in its demands for harbors, boats, power plant, sewage decontamination plant, fire and ambulance services - all unavoidable because of our mission, biological containment and island location. Over 35 years, ARS/APHIS have not had the recurring budget resources to provide all necessary additional facilities, major repairs and major equipment replacements - a great deal of USDA Headquarters money has been put into PIADC, but this has not been enough.

In 1984, USDA recognized that significant facilities changes were needed at PIADC and a plan was drawn up to reduce operating costs by consolidating ARS and APHIS facilities at the site of Building 101. The initial intent was to accomplish this by internal ARS/APHIS funds. Little progress was made on this until late 1987, largely because of changes in leadership at all levels in ARS and APHIS. However, in FY-1988, ARS received a Congressional appropriation of \$9 million towards the costs of Facilities Consolidation (this money reflected a 1987 court settlement in favor of USDA against the bonding company responsible for insurance of the defaulted (1978) Vaccine Research Laboratory at Building 101).

In the past year, plans have been drawn up for Facilities Consolidation and the contract for detailed design will be let soon. Completion is expected by Summer 1993 at a cost of \$16 million (the additional \$7 million, which is needed mostly for enhanced biocontainment in the APHIS labs, will be shared by ARS and APHIS). The new plan is very much better than the earliest concept of shared facilities, which would not have provided good biological separation of ARS and APHIS. While the PIADC staff have been disappointed that new facilities are not already available, the additional wait will not be in vain because the results will prove much more satisfactory over the next 30 years.

The basic plan for Facilities Consolidation at Building 101 is as follows (see Figures 1, 2 and 3 for floor layout):

- APHIS will move into Labs A and B in Building 101 and will use the West Animal Wing and West Incinerator. The APHIS unit will be self contained and biologically isolated from ARS laboratories. APHIS personnel will enter APHIS areas through the central basement corridor, which will be denied to ARS.
- ARS scientists from Labs A and B of Buildings 101 will relocate to new labs in the West Services Wing and will use the East Animal Wing, the Orient Animal Wing and the East incinerators. ARS will be biologically isolated from APHIS laboratories and animal wings. ARS personnel will enter ARS areas through the first floor corridor, which will be denied to APHIS.
- Support service areas in the basement and second floor will be controlled by ARS Engineering and Plant Management staff.

- A new Administration/Support building will be erected in front of Building 101 on two floors. This new construction will be non-biocontainment and will be biologically separate from ARS and APHIS in Building 101.
- All Administrative/Support functions will be relocated to the new 101 building and facilities elsewhere will be closed.
- Building 257 (APHIS lab) will be closed.
- The old Vaccine Research Lab will be demolished.
- Plum Island Animal Disease Center will then consist of: the Plum Island Dock and Warehouse Complex, Animal Care Quarantine and Holding Areas (Bldgs. 21 and 62), the Duty Officer's House, and the Building 101 Complex - Laboratory, Administration, Power Plant, Sewage Plant, Firehouse.

Facilities Consolidation will save about \$ 2 million/year in operations and salaries - about 30 support jobs will be cut.

The additional \$7 million beyond the \$9 million already appropriated by Congress for Facilities Consolidation is largely required for increased biocontainment in the new APHIS area in Building 101. When original plans were drawn up in 1983/84, it was not envisioned that the labs would have High Efficiency Particulate Air (HEPA) filters, the most efficient type (99.97%) for filtering airborne viruses (presently, Labs A and B have a mixture of HEPA and deep bed [95% efficiency] filters). Retrofitting APHIS areas in 101 with HEPA filters would be very difficult once the lab is operating after consolidation because the areas involved would need to be shut down for 6 months or so. The APHIS lab needs to be biologically secure from accidental contamination from ARS areas, so APHIS air inlets need HEPA filters, and air outlets also need HEPA filters to avoid live viruses escaping into the atmosphere. All biocontainment devices need to be in place when the lab opens.

Summary

Since the early 1980s, two large shadows have hung over PIADC. The first was the proposal to move the Center to a new site on the mainland, which has had the effect of chilling many possible developments on the island. The second was Facilities Consolidation, which resulted in the decay of facilities which were to be abandoned without any immediate prospect of new replacements.

I believe the results to date show that the proposal to move PIADC to the mainland in order to strengthen the Science and Mission is no longer valid.

I believe that Facilities Consolidation is now an imminent reality and that adequate steps have already been taken to reverse the decay in temporary facilities in the interim.

I believe that ARS-PIADC has taken extraordinary steps already to cut overhead costs of operations and to plow these savings into Science, Facilities and Equipment.

I believe that ARS and APHIS Headquarters are making, and have made, every effort to assist PIADC with additional funds as available.

But I also believe that no matter how efficient we may be on the island, and how much extra funding may be provided from Headquarters, the necessary facilities improvements cannot be met without a new Congressional appropriation, possibly of \$40-50 million. Compared to a new Center on the mainland (\$400 million) or a new research laboratory on the mainland (\$100 million) with improvements on the island (\$20 million), renovating existing facilities at PIADC is a bargain. The result will be a first class, highly-secure biocontainment laboratory that will meet the needs of the US and the hemisphere for another 30 years.

The major equipment/facilities needs are spelled out in the accompanying document.

Building 101 – First floor facilities consolidation

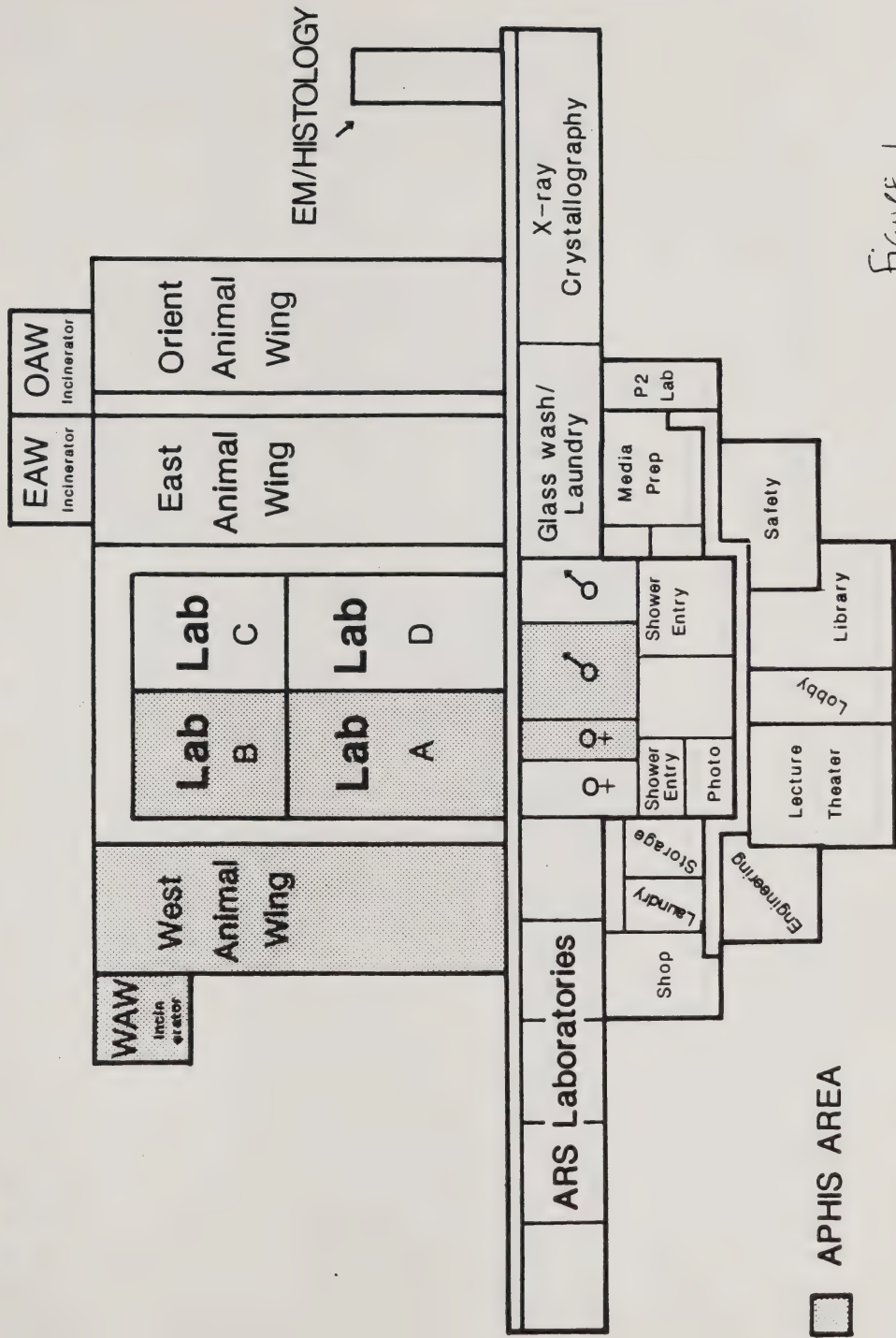
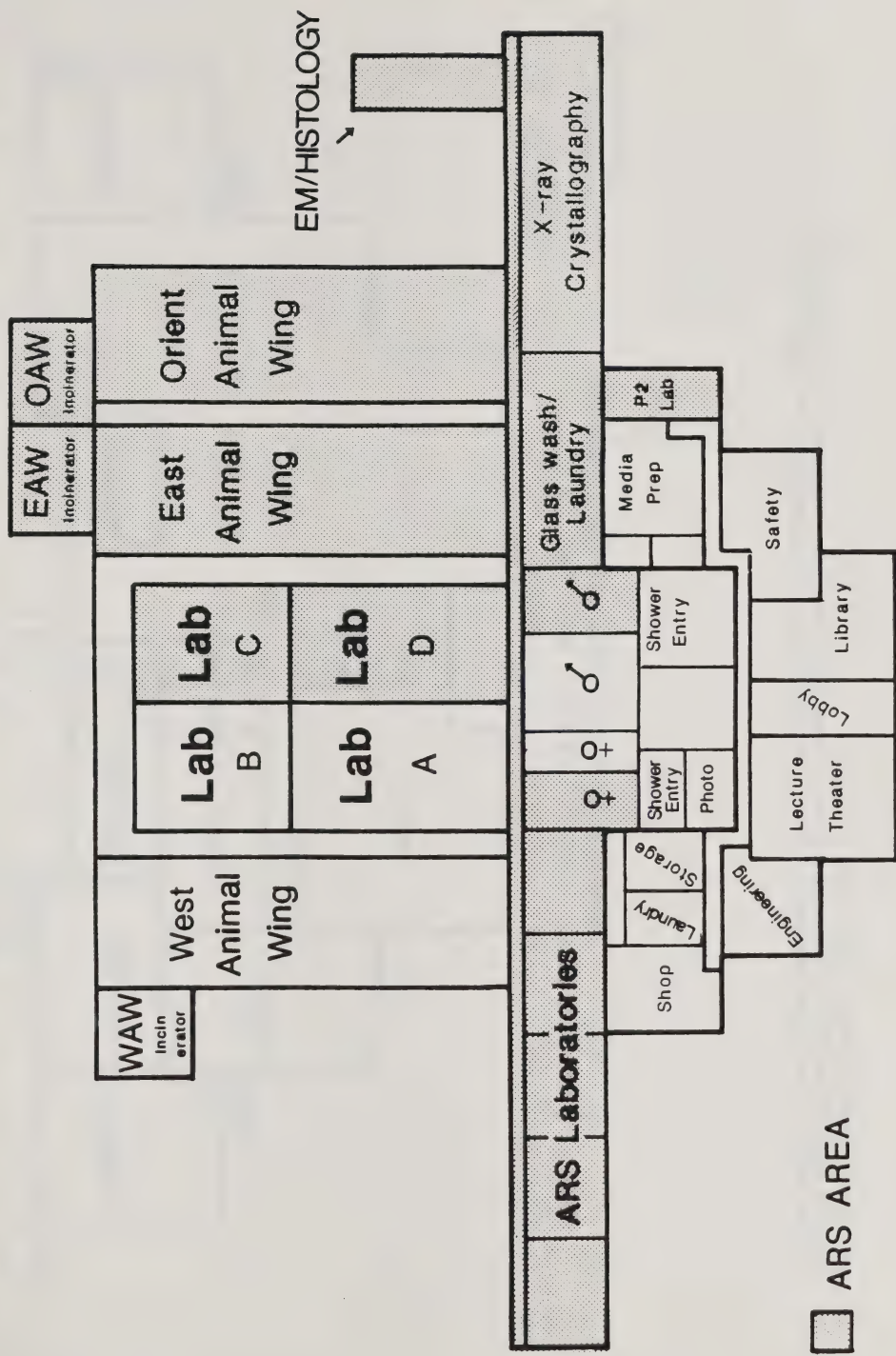


Figure 1

Building 101 - First floor facilities consolidation



ARS AREA

Figure 2

PIADC MAJOR EQUIPMENT/FACILITY NEEDS

The document overleaf was prepared in April 1989 and itemizes about \$25 million of urgent, identifiable facility/major equipment needs. We realize, however, that PIADC cannot have an incomplete renovation if it is to serve for the next 30 years. Therefore, we are planning to have an Engineering Consultant firm perform an exhaustive facilities deficiency study in Fall 1989 with the aim of identifying everything that needs to be fixed or upgraded. The timing of this is right because the recent agreement on Facilities Consolidation allows us to see what PIADC will look like in the year 2010. The needed facilities/major equipment costs can be expected to increase after the study, perhaps to \$40-50 million.

United States Department of Agriculture
ARS, NAA, PIADC, Greenport, NY

PIADC Major Equipment/Facility Needs

Facilities at PIADC have been allowed to deteriorate to an embarrassing degree. Even with an R&M budget exceeding 6% of our base, we are falling behind. PIADC is in a harsh environment, buffeted by severe weather and seas. Our harbors, boats, power plant, cooling and air-handling systems, undersea power and telephone cables are not typical of other ARS locations, and the costs of their R&M are unending. The disease agents we work with are very infectious and the vigorous disinfection procedures need to ensure decontamination of animal rooms and corridors result in rapid and repeated deterioration of paint, metal and concrete. There is nothing, and nowhere, else comparable in ARS - foot-and-mouth disease is the most infectious disease agent known in man or animals and our precautions/costs to contain this virus are far in excess of anything at NADC, Ames, for example. In addition, we are in an extremely high cost area for contractor services and utilities - fuel oil and electricity accede \$1 million/year.

As co-tenants, ARS and APHIS need to join forces and develop long range plans for the repair and maintenance of the facilities. It is proposed that an A&E firm be commissioned to develop a Facilities Deficiency Plan which will identify immediate and long term needs along with costs, which can be used for planning and budgetary purposed. The cost of such a study is estimated at \$250,000.

The following is a list of the most obvious needs as identified by PIADC staff:

1. ORIENT POINT

During FY-89 we will be renovating the Orient Point office facility, which is used for Budget, Procurement and the Boat Crew. There will be a Display Hall, open to the public, describing the functions of PIADC (the adjacent Orient Point ferry to Connecticut is used by hundreds of thousands of tourists each year). There will be some landscaping at the Center entrance and improved public car parking.

a) Dock Area

The harbor is exposed to heavy weather/wave action and there is relatively little protection for boats in the harbor.

We want a design study of the harbor to determine how best to reconstruct the finger pier (now in advanced decay) and to determine if wave action could be modulated, perhaps by placing large rocks adjacent to the bulkheads to dissipate wave power. Much of the bulkhead needs to be replaced with 40-year bulkhead material - so now is a good time to examine the future configuration of the harbor. The study should also examine the Plum Island harbor configuration.

b) Parking Lot

The parking lot must be resurfaced.

c) Estimated Costs:

Design study of harbor.....	\$ 30,000
Bulkhead renewal (40-year material).....	900,000
Remove old finger pier, install new pier.....	250,000
Resurface parking lot.....	<u>165,000</u>

Subtotal: \$1,345,000

2. BOATS

As we explained in 1987 ("Marine Services to Plum Island"), the "M. S. Shahan" and "Plum Isle" are nearing the end of their useful lives and the long-delayed major repair bills are now due. The "PIADL IV" is obsolete/ and has been replaced with the "J. J. Callis".

We propose to replace the Shahan and Plum Isle with one new passenger/ vehicle vessel before there are any more major repair costs. A small boat is also needed for maximum economy in transporting shift crews in good weather.

a) Estimated Costs:

Replacement for M. S. Shahan/Plum Isle (200 passenger/small vehicle [ambulance, pick-up truck], freight).....	\$1,500,000
40-60' Bertram/Hatteras motorcruiser for 8-10 passengers.....	<u>500,000</u>

Subtotal: \$2,100,000

3. DOCK AREA AND GUARDHOUSE, PLUM ISLAND

Plum Island wooden bulkheads need to be replaced with 40 year material (emergency repair of 207 linear feet for \$245,000 being conducted this FY). The design study of Plum Island harbor will identify necessary new riding piles, dolphins, etc.).

The Butler building, which stores E&PM large machinery - tractor, snow equipment - needs a new roof and siding.

Guardhouse functions will move to Building 101 after consolidation in 1992.

a) Estimated Costs:

Butler building, siding and roof.....	\$ 80,000
Bulkhead renewal (40-year material), dolphins, riding piles.....	<u>500,000</u>

Subtotal: \$ 580,000

4. UTILITIES/TELECOMMUNICATIONS

The undersea electric power cable has reached its average life expectancy. If it breaks, it could be replaced at a cost of \$1,200,000, but preliminary studies in E&PM have shown that electrical self-generation capacity would be a very cost-effective alternative option (savings of \$285,000/year). Funds for a study of self-generation were requested in 1989 HPRL.

a) Estimated Costs:

Self-generation feasibility study.....	\$ 25,000
Self-generation equipment.....	<u>750,000</u>

Subtotal: \$ 775,000

We receive #6 fuel oil by barge and it is pumped 3500' by the Ric-will line to fuel storage tanks on the north side of the island adjacent to the Power Plant. Changes in local codes will likely mandate construction of impervious concrete or clay safety barriers around the fuel tanks to contain oil if the tank ruptures. We also need to replace underground fuel tanks throughout the island because of code changes. In the Power Plant (Building 103) a boiler needs replacing and new heat exchangers are needed.

b) Estimated costs:

Renovate Ric-will line.....	\$ 250,000
Safety barriers.....	85,000
Boiler.....	750,000
Heat exchangers.....	<u>440,000</u>

Subtotal: \$1,525,000

PIADC has its own water system, much of which dates back to Army days, and the distribution system is a combination of asbestos/cement and cast iron pipes. We are improving our wells in FY-89. Our tests show no asbestos contamination of drinking water. Local codes may force replacement of asbestos pipe.

5. WASTE DISPOSAL

An additional sewage stabilization lagoon is needed: sewage from 102, 257, and the administrative area is pumped to the secondary treatment plant (105) where it is aerated before going to the stabilization lagoon. Changes in local state and county codes on trash/waste disposal will result in closure of our landfills (possibly as early as 1991), which must be replaced by clay or fabric-lined landfills with monitoring wells and sampling ports (the alternative would be to send waste to a hazardous waste disposal site). OGC must determine if PIADC must comply with local codes. If so, we need to do a study to see where such a landfill could be built and how it should be constructed.

a) Estimated Costs:

Construct stabilization lagoon.....	\$ 200,000
Study of landfills.....	75,000
Construct landfill.....	<u>400,000</u>

Subtotal: \$ 675,000

6. ANIMAL FACILITIES

Clean animals are kept in a quarantine facility (Building 21) while waiting to go into Building 257 or 101. The bovine embryo transfer research has resulted in pregnant cows being brought from the Orient Wing, Building 101 to Building 62, which is regarded as a "grey" area of quarantine.

ARS intends to contract-out its clean animal supply to a farm on Long Island or in Connecticut and has no plans to improve Building 21. APHIS will continue to use Building 21 and this must be improved to Welfare standards for them (office, showers, toilets, workroom for staff, and concrete yards for animals).

EPA personnel have opposed grazing animals on PIADC because of possible water pollution. Disposal of Buildings 21/62 manure is a problem - we will not be able to put it in landfills; there is a problem spreading it on fields (when the 1978 FMD outbreak occurred at PIADC, manure from infected animals had been spread on the fields, which then had to be treated with lye). A manure composter was erected 10 years ago but has not worked; it may be repairable or we may have to construct another. Manure from animals in the labs goes to the Sewage Treatment Plant.

a) Estimated Costs:

Building 21 renovation.....	\$ 350,000
Building 62 renovation.....	100,000
Composter.....	<u>400,000</u>

Subtotal: \$ 850,000

7. SAFETY

Security in the past has concentrated on preventing public access to the island (mostly accidental); there is very poor internal security in 101 and little capacity to prevent unauthorized entry. Future security will concentrate on controlling anticipated deliberate, planned intrusions into Building 101 and its animal facilities, and internal access by PIADC staff within the 101 complex. A design study for a basic card entry system is underway in 101. Infra-red TV cameras should be installed to cover a new microwave perimeter fence around the 101 compound. External and internal Bldg. 101 alarms should be integrated at a command post and 101 lobby. Closed circuit TV cameras and additional card-entry security doors should be placed in corridors within 101. A public address system in 101 would warn employees of fire, gas or other emergencies.

We do not plan to invest in electronic entry/surveillance equipment for Building 257 since consolidation is imminent.

We need a new modern firetruck with at least 1250 gallons water reserve and adequate pumps. Fire prevention is critical at PIADC. Our crew of 4 firemen can only tackle a very small fire. We plan mutual assistance arrangements with local fire districts and would bring additional firetrucks to PIADC by boat. Unless we are prepared to watch as Building 101 goes up in flames in a major fire, the fire strategy must be:

- o The very best fire detection/sprinkler/spread control equipment so that the PIADC fire crew can respond when the fire is very small.
- o A command center where PIADC firemen will coordinate/control activities of many mutual-assistance firemen from North Fork fire departments.

We need a study by a fire control expert to examine our current fire prevention equipment and strategy in Building 101 (including post-consolidation) to determine what else is needed and to prepare and evaluate our emergency response plans. We already realize we need to establish fire emergency stations within 101 that would contain back-up equipment, air bottles, etc.

a) Estimated Costs:

Firetruck.....	\$ 150,000
Study of fire safety.....	75,000
Infrared cameras on microwave fence/TV cameras in 101/additional security barriers in 101.....	<u>440,000</u>

Subtotal: \$ 665,000

8. BUILDING 101 AND ENVIRONS

Building 101 and its utilities are 35 years old and there is a substantial and continuing routine R&M commitment to steam pipes, drain lines, sewers, water pipes, electric service, air filtration and handling and basic utility services, in addition to emergency and one-time needs.

New all weather roads are needed for winter access to the east end of 101 and the security lighting in that area needs to be improved.

HEPA filters have been installed on about half the air outlets from 101 (replacing deep-bed filters) - we need to plan for HEPA filters in all inlets to meet increasing safety standards and to complete the HEPA installations on all outlets.

Caustic/corrosive disinfectants used in the animal wings exact a heavy toll on metal and painted fixtures. To save labor costs in scraping/painting rusty fixtures, we want to replace all remaining animal wing corridor doors

with the air-gasketed galvanized type and all animal room internal doors with galvanized steel.

Motor controls for the electrical services in Building 101 are in urgent need of replacement.

The incinerators in Building 101 need renovation. The West Animal Wing incinerator, which APHIS will use after consolidation, needs a new refractory lining (a new emergency escape door is being installed in the area of this incinerator to meet safety regulations). The "old incinerator" was taken out of service in 1987. The stack needs to be demolished for safety reasons and the interior needs to be stripped to use for storage, environmental chambers and possibly a Safety emergency store for firefighting equipment.

The roof on Building 101 will need major repairs or possibly total replacement within 5-10 years.

Sterilizers/autoclaves/Ethylene oxide sterilizer in the receiving area of Building 101 need replacing - the Ethylene oxide sterilizer should be physically isolated for safety reasons.

a) Estimated Costs:

Roads/lighting east end 101.....	\$ 200,000
Lab A, B, C, and D renovations.....	800,000
HEPA filters on remaining OUTLETS (44 in services wings, mechanical spaces, 101 basement at \$175,000 each).....	7,700,000
HEPA filters on all INLETS (25 in animal wings, 7 on 1st floor labs, 2 in basement labs), 34 inlets at \$175,000 each.....	5,950,000
Motor controls.....	440,000
Repair roof (whole roof \$1 million).....	250,000
Incinerator	
refractory lining WAW incinerator	100,000
emergency door WAW incinerator (OSHA citation)	200,000
remove stack, strip interior old incinerator....	250,000
Air gasket/galvanized doors animal rooms and corridors.....	300,000
Replace 6 autoclaves at \$100,000 each.....	<u>600,000</u>

Subtotal: \$16,190,000

SUMMARY OF FACILITIES/MAJOR EQUIPMENT NEEDS

Orient Point.....	\$ 1,345,000
Boats.....	2,000,000
Dock Area Plum Island.....	580,000
Utilities.....	2,575,000
Oil/Power Plant.....	775,000
Waste Disposal.....	675,000
Animal Facilities.....	850,000
Safety.....	665,000
Building 101.....	16,190,000
Deficiency Study.....	<u>250,000</u>
TOTAL:	\$24,835,000

Clinical Syndromes in Veterinary Neurology. Kyle G. Braund. 257 pages; illustrated. Williams & Wilkins, Baltimore, Maryland. 1986. Price \$37.95.

When I graduated from veterinary college, Hoerlein's *Canine Neurology* (now, *Veterinary Neurology*) was the standard neurology text to take into clinical practice. Since then, several single- or dual-authored texts on veterinary neurology have appeared. Each one offers the diagnostician a slightly different viewpoint. In *Clinical Syndromes in Veterinary Neurology*, Dr. Braund has classified neurological diseases into 14 syndromes, e.g. neuropathic, myopathic, lum-

bosacral, cerebral, multifocal, etc. The clinical features and common causes of each syndrome are covered. In another chapter, 141 specific neurological diseases of dogs and cats are presented in alphabetical order. Each disease is succinctly summarized, including etiology, breeds affected, clinical presentation, diagnostic aids, treatment and prognosis; the reference list is extensive. Other chapters are *Neurological Examination*, which is well-illustrated with photographs, and *Diagnostic Techniques*, which includes brief reviews on radiography, electrodiagnostics (electroencephalography and electromyography, but not evoked potentials), CSF examination, muscle and nerve biopsy tech-

niques and also neurosurgery. The index is excellent because it also lists breeds.

In general, although *Clinical Syndromes in Veterinary Neurology* is not a comprehensive reference on all aspects of veterinary neurology, the approach by clinical syndrome is new. Students and clinicians who feel uncomfortable with diagnosing and localizing diseases of the central and peripheral nervous systems may well want to learn this method.

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Auburn University

VETERINARY HISTORY

HISTOIRE VÉTÉRINAIRE

Canada's Experience with Foot-and-Mouth Disease

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Canada has had very little experience with foot-and-mouth disease (FMD) during its history. The disease was first reported to have been observed in Canada in August 1870, having been introduced by cattle landed in Montreal. The infection did not survive the winter. In 1875 it was reported to have occurred near Toronto in some imported sheep, although again the infection did not survive the winter. There is some doubt as to whether the diagnosis of these two outbreaks was accurate. Based on present knowledge and experience with the disease, its elimination by the cold winter is hard to accept. In fact one veterinarian reported at the time that the rumors of an outbreak of FMD in 1870 were

unfounded; he attributed the symptoms to an attack of flies.

The only confirmed outbreak of the disease in Canada occurred in Saskatchewan in 1951-52 (Table 1). On November 30, 1951 Mr. L.T. Wass, a farmer from McLean, Saskatchewan, a village some 30 miles east of Regina telephoned the Provincial Veterinarian in Regina to report that he had some sick cattle. That call initiated a series of events that had a major impact on Canada's livestock industry for well over a year. A detailed examination of the history of events of the outbreak of FMD in Canada can provide useful insights as to problems or issues that could arise should another outbreak ever occur in Canada.

Following the call from Mr. Wass, Health of Animals Division veterinarians at Regina visited his farm on December 2, 1951. The condition was

initially diagnosed as vesicular stomatitis. The Veterinary Director General issued instructions to quarantine the herd and keep it under observation. The disease was apparently very mild at this stage, no foot lesions or other complications being noticeable. Recovery was quite rapid and complete.

About December 10 two neighbors, who had earlier helped Mr. Wass with his cattle, noticed their cattle were off feed and drooling. On December 18, 1951 a similar condition was noted among cattle in a feedlot on the premises of a packing plant in Regina. In all cases the condition was mild and recovery was rapid. In all instances the affected premises were placed under quarantine and observation.

For most of the month of January, 1952 no new cases were reported. At the end of January and in the first few days of February, a number of

TABLE I
Chronology of Foot-and-Mouth Disease Outbreak in Canada

1951	
26 Nov	Disease noticed in cattle on Wassy farm
3 Dec	Quarantine imposed on Wassy farm
8 Dec	Field test in horses indicated vesicular stomatitis
23-29 Dec	Disease observed on neighboring farms and in a feedlot
1952	
23 Jan-11 Feb	Disease observed in several farms in the Regina area
11 Feb	Foot-and-mouth disease suspected after lesions observed in pigs on one of the farms
14 Feb	Vesicular material sent to Ottawa for laboratory examination
18 Feb	General quarantine imposed
12-19 Feb	Disease diagnosed on several new farms, including two near Truxy, Saskatchewan
25 Feb	Laboratory confirmation of foot-and-mouth disease. U.S. closes border to livestock and meat from Canada
19 Apr	Disease appears on a farm near Ormiston
29 Apr	Disease observed on a farm near Weyburn
14 Aug	Canada declared free of foot-and-mouth disease
1953	
2 Mar	U.S. lifts all trade restrictions on animals and meat products

new cases appeared on farms north-west of Regina. These outbreaks assumed a more serious form. Vesicular lesions were found, accompanied by serious loss of condition, with foot and udder involvement. This time swine were noted to be involved. The worsening situation was reported to Ottawa and samples were requested to be sent to Ottawa for laboratory examination. On February 16, Dr. Childs, Veterinary Director General personally went to Regina to visit the infected premises. Based on the evidence he felt sure that they were dealing with foot-and-mouth disease and ordered the quarantine of six rural municipalities.

The only confirmed outbreak of the disease in Canada occurred in Saskatchewan in 1951-52.

On February 25, 1952 following positive laboratory diagnosis, it was publicly announced that the disease in question was foot-and-mouth disease. That announcement triggered a number of events which severely disrupted the Canadian livestock industry in the months that followed.

The United States government immediately imposed a complete embargo against imports of livestock, and fresh and frozen meat from Canada. Furthermore, additional restrictions on other products such as cured and cooked meats, hay and straw, and animal by-products such as bone

meal, blood meal, wool, hair, and hides were imposed. On February 29, Canadian hams and bacons were exempted from the U.S. embargo provided they were accompanied with a certificate from the meat inspection service, Federal Department of Agriculture.

One day after the announcement of the disease, the B.C. agriculture minister announced an embargo on all meat and livestock shipments into the province from Alberta, Ontario, followed by Quebec, imposed embargoes on meat from Saskatchewan and Manitoba. Manitoba in turn embargoed livestock and meat from Saskatchewan. These provincial embargoes began to be reduced on about March 19 with the last restrictions being eliminated on April 19. During this period of almost two months a marketing patchwork existed with surplus meat supplies in some regions and shortages in others.

On March 7, Agriculture Minister Gardiner announced that meat imports into Canada be on a permit basis only to assure the domestic market for Canadian livestock producers. On April 20 the federal government announced a price support program on the basis of \$25/cwt for top grade steers at Toronto. On May 10 the Agriculture Minister announced a barter deal whereby Canadian meat would go to Britain (40 million pounds in 1952). Canada, in exchange, would take over from Britain New Zealand frozen beef, which Canada in turn would sell to the U.S., thus filling

part of Canada's normal market for beef in the U.S.

The first two months following the declaration of FMD represented a period when the outbreak received considerable newspaper space, radio time, and attention in the House of Commons.

Veterinary officials received reports of disease from many districts, most of which were false alarms. Irresponsible rumors and accusations were common. On April 30, 1952 the House of Commons Agriculture Committee opened a hearing on the handling of the foot-and-mouth disease outbreak. The main focus of the inquiry was why it took so long from the first reporting of the disease to its correct diagnosis as FMD.

The outbreak itself was efficiently and effectively dealt with following its announcement, in spite of the harsh winter weather that gripped the Prairies. Slaughter and burial of infected cattle began on February 29 and was substantially completed by March 13, although the disease was diagnosed on two farms outside the quarantine area after that date. Disinfection of infected premises quickly followed. All loose litter, straw, hay, feedstuffs, etc. were collected and burned. The barns, stalls and surroundings including manure piles were drenched with lye solution. Once warmer weather arrived, additional thorough disinfection was carried out.

It is suspected that the FMD virus was present in some sausage that the worker brought, the scraps of which were fed to the pigs.

When the outbreak was correctly pinpointed, 42 premises were under close supervision; 29 of these were infected premises and 13 were contact premises. These premises were within an area of close quarantine comprising 21 rural municipalities. This area of close quarantine was surrounded by a larger area of modified quarantine comprising 41 rural municipalities. The individual quarantines were quite strict. Not only could no livestock or livestock products leave the property but even residents were not allowed to leave the property until all livestock were killed and buried and the premises disin-

fect. All needed groceries, mail, etc. were delivered to the farm gate during this period.

The foot-and-mouth outbreak was believed to have been introduced by a West German immigrant farm worker. Seventeen days after he left an infected farm in West Germany he went to work on the farm of Mr. Wass. It is suspected that the FMD virus was present in some sausage that the worker brought, the scraps of which were fed to the pigs.

An outbreak of FMD can occur under the most unexpected circumstances and improbable areas of Canada.

The infection had been carried from the Wass premises to neighboring farms, a packing plant, packing plant feedlots, and a large dairy herd in the vicinity, one week to ten days before the condition was reported to Health of Animals Division. The quarantines established, when the disease was first diagnosed as vesicular stomatitis, had the effect of preventing further spread from those premises where disease had been reported.

As of August 19, 1952 Canada declared itself free of foot-and-mouth disease and all quarantines were discontinued. Animals destroyed during the outbreak were: 1343 cattle, 293 swine, 97 sheep, 11 goats, 2372 fowl, and 15,828 eggs. The compensation paid for these animals and eggs was \$375,281. In total the cost to eradicate the outbreak was nearly \$1 million (Table II). On March 2, 1953 the U.S. trade restrictions were lifted, just over one year from the announcement of the outbreak.

The total economic costs of the outbreak have not been determined. However, in addition to the nearly one million dollars in eradication costs, the government spent \$70 million in supporting prices. Furthermore, the Bureau of Statistics estimated that the drop in cash inventory value of livestock was \$654 million during the three month period following the outbreak. Cattle prices dropped rapidly following the outbreak. For example, average steer prices in Calgary as of January 1952 were \$31 per cwt, \$28 in February, and \$24 in March. Steer prices in Calgary dropped to a low of \$21 in October. For 1953 the

prices started at a high of \$21 in January and continued to fall to a low of \$17 in December. Exports of beef to the U.S. dropped from 177 million pounds in 1951 to only five million pounds in 1952 as a result of the trade embargo. Even after the U.S. embargo was lifted the exports of Canadian cattle and meat to the U.S. remained low. The reason for this was the good supply situation in the U.S., where prices had also been dropping, so that by the time the embargo was lifted Canadian export performance following the lifting of the embargo appears to be due mainly to weak U.S. prices rather than residual effects of the FMD outbreak.

In examining this outbreak there are a number of lessons that can be learned which would apply to any possible future outbreak.

1. An outbreak of FMD can occur under the most unexpected circumstances and improbable areas of Canada. Consequently it is necessary to take all reports resembling FMD seriously, even if they appear improbable.
2. There will exist a period of time (several days to several weeks) from the time animals become sick with FMD until the disease is reported to government veterinary officers. During this period of time the disease may or may not be widely dispersed depending on the number of contacts with the infected animals, or spread of the disease by other means.
3. There will be a period of panic following the announcement of the

outbreak which could last for weeks or months. During this period livestock markets will be completely disrupted and provinces may impose restrictions on livestock movement to their region.

4. There will be demands by producers on governments (federal and provincial) to take action to stabilize prices.

The potential of another outbreak of FMD in Canada is always present. This review of the 1952 outbreak has shown that in addition to the complexities of eradicating an outbreak, there will develop a complex set of economic and political pressures that must also be dealt with.

Acknowledgments

I would like to acknowledge the helpful comments from Dr. Bob Sellars.

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TABLE II
Expenditures (in dollars) to Combat 1952 Foot-and-Mouth Disease Outbreak in Canada

Administration	
Salaries of temporary staff	27,001.87
Wages	106,474.05
Travel	166,403.82
Equipment purchase	20,623.22
Equipment rental	47,734.20
Equipment repair, maintenance	3,425.77
Supplies	53,989.79
Freight and express	3,003.90
Telephone, telegram, postage	2,980.29
Contracts for premises disinfection	39,557.38
Miscellaneous	3,434.92
Sub-total	474,629.21
Compensation	
Animals, eggs destroyed	375,281.42
Other items destroyed	127,706.60
Sub-total	502,988.02
Grand total	977,617.23

Will Your Livestock Be Shot?



With Royal Canadian Mountie rifles cracking overhead, these fine cattle slump to the bottom of a huge burial trench. More than a thousand head of livestock have been shot in five of these pits during Canada's clean-up of her foot-and-mouth outbreak early in March. It could happen in your community, or on your farm — the infection is only 60 miles across the border.

FARM JOURNAL
APRIL 1952

Here is an urgent message for every livestock raiser in the country. After you have read this article, reprinted with additions from the April issue of Farm Journal, you won't rest peacefully until you have done something about it.

Get That Foot-and-Mouth Lab!

Surrounded by a world aflame with foot-and-mouth disease, we're sitting like a dry haystack next to a burning barn

The outbreak of foot-and-mouth disease in Canada shows how easily this deadly infection can get started—and how it can race through a farm community before it is detected. For details of this Canadian outbreak—which makes a laboratory even more urgent—see Farm Journal, April, page 31.—Editors.

LIVESTOCK farmers—and everybody who eats meat and drinks milk—are sitting on a volcano that could blow sky-high. The Canadian outbreak might set it off.

But this new threat to the North is only part of the danger. And maybe the least part.

You haven't been hearing so much about other angles, but here they are:

- **A new strain of the disease**—which popped up from nowhere—is sweeping Western Europe like a prairie fire. And no vaccine in the world will hold it. Europeans are working feverishly to get a vaccine that will hold—haven't got it, at the last report.

- **Three new types of foot-and-mouth** have been found in South Africa recently. No vaccine now exists that can protect against them, either. Other types could spring up anywhere, any time.

- **An outbreak in Mexico** last August shows that after spending five years and \$123 million we still haven't wiped out the threat just south of us.

- **A traveler could bring in any of these new strains** any day, accidentally and innocently. Or, a ruthless enemy could walk right past our Customs Officers with the virus in a bottle labelled "perfume"—and could turn it loose in our stockyards, or at our fairs. It could spread from coast to coast before we knew what had happened.

Any would-be enemy already realizes this perfectly well. But do you?

Why are we sitting here without

protection? Are we waiting for an outbreak smack in the middle of the Chicago Stockyards? What does it take to get protection, and why aren't we getting it?

The most important thing we can do is to establish a virus laboratory where we can develop better and cheaper vaccines—and make them in great quantities if we need to. We need to study the virus itself to find out how it spreads; how long it will live in barns, in manure, in bedding, in meat; and how to kill it.

All this would help us fight other viruses, too—for which no cures exist today—both in animals and humans. The discoveries wouldn't be limited to foot-and-mouth disease.

Such a laboratory would cost perhaps \$25 million—a fifth of what we've already spent in Mexico, and peanuts compared with the \$400 million that farmers would lose each year if foot-and-mouth got established here.

We've Got the Threat

Then why haven't we got the laboratory? Well, that's something *Farm Journal* suggests that you ask your Congressmen and Senators—and ask now, individually and in groups. Next year's budget is being made up right now. It's going to take two to three years to build the lab after we get the money. We can't twiddle our thumbs a moment longer.

Actually we've got—and have had—everything that's needed except an appropriation by Congress:

Take another look at that map on the opposite page. See how 75% of the world is ablaze with the disease. We're surrounded by it—east, west, south, and now north. We're like a dry haystack standing next to a burning barn—several burning barns.

Our livestock industry is tailor-made for spreading foot-and-mouth. No other country ships livestock from one

end of the land to the other as we do; feeder cattle and sheep from the range to the Corn Belt, dairy cattle from one part of the country to another, breeding stock to all parts of the country. Every day hundreds of thousands of animals flow to and from stockyards, in and out of sales barns.

Our livestock industry is built on this kind of rapid movement: Foot-and-mouth disease would cripple that. Farmers in infected areas would be cut off from markets by quarantines. Livestock values would fall; many farm investments would be wiped out.

In severe cases of foot-and-mouth, fat hogs shrink to skeletons. They have to walk on their knees for weeks because their hoofs are gone. Fat steers lose 200 to 500 pounds, and are barely able to walk; some can't. Milk cows dry up, and stay dry until they freshen.

Livestock with sore feet can't travel our ranges looking for grass. Animals with peeled, tender tongues can't eat dry hay or hard grain.

Slaughtering all animals in infected zones is the only method that has ever successfully stopped foot-and-mouth. But this is frightfully expensive in big outbreaks. We'd better be ready to vaccinate, or find other ways of stopping this disease; particularly if it were to hit us hard during war, severe inflation, or heavy defense build-ups—when meat would be scarce and prices and expenses abnormally high.

We've Got the Law

We don't have to start from scratch. There's already a law on the books which authorizes the Secretary of Agriculture to build this laboratory. It was passed on April 24, 1948, at the height of the outbreak in Mexico. As we gradually gained the upper hand, we relaxed; the money was never appropriated. We didn't foresee that it was such a big mistake—but it becomes clearer every day.

Continued on next page.

Why haven't we got that lab?

Congress did decide one thing definitely: that the laboratory was to be in this country, just off our shores. There are sound reasons for that, instead of having it in Mexico, or spending the money in European laboratories.

A laboratory in Mexico would need to be run cooperatively by us and the Mexicans, some of whom would be less well-trained than workers in a laboratory in the U.S. This would offer an easier chance for the virus to escape and race to our border. Even if such an outbreak were checked while still in Mexico, the people there might insist that the lab be closed down to prevent such a thing from happening again. We would have completely lost a valuable piece of property.

A laboratory in Mexico—compared to one in the U.S.—would also be harder for us to protect against bombing or sabotage in case of another world war.

Sending American scientists to foreign countries to work in their foot-and-mouth laboratories has never been very satisfactory. The foreign facilities are already over-crowded; equipment is inadequate; and research is interrupted regularly to manufacture vaccine to cope with outbreaks. We have to work at the foreigner's pace, under his direction, and on his problems. You can't get an outstanding American scientist to stay very long under those conditions.

We need the lab most in case of war. Yet within the past 10 years, 8 out of 10 of the European labs have fallen into the hands of our enemies. We want the lab where we can control it, peace or war, and be able to use it to study other diseases when we have licked foot-and-mouth.

We've Got the Plan

At the request of Congress, the Bureau of Animal Industry drew up plans for the laboratory back in 1948. Before they finished, the Bureau scientists had studied the good and bad points of other virus research centers all over the world.

Every known precaution is in those plans. This would be the safest laboratory in the world—safer than the wartime secret laboratory in the St. Lawrence River where we studied deadly rinderpest.

In 18 months in that laboratory, scientists progressed from an expensive,

slow-to-make vaccine against that deadly killer to a cheap, strong, simple-to-make vaccine. When they got through we could make—in a week—all the vaccine we'd need to vaccinate every head of cattle in the United States and Canada. That's what a good laboratory can do!

Senator Clinton Anderson, who was Secretary of Agriculture during the Mexican outbreak, predicts to *Farm Journal* that "Within a short time after the laboratory is finished, foot-and-mouth disease would no longer be a serious threat." And here we sit without it!

We've got the best virus-disease talent in the world; but no place for them to work on foot-and-mouth disease.

We've Got the Demand

Farm Journal has taken a poll of livestock and farm organizations, and finds them unanimous in demanding a laboratory.

"It is now high time that Congress give serious consideration to this matter," wires the American National Cattlemen's Association.

"Our Association has been on record since 1948 favoring this appropriation," replies the National Wool Growers.

"Our committee on foot-and-mouth disease emphasizes the necessity of setting up the laboratory," declares the U.S. Livestock Sanitary Association.

The American Farm Bureau, the National Grange, and the Farmers Union all favor starting the laboratory immediately.

Many other farm groups and livestock organizations feel the same way.

The Senate and House Agriculture Committees likewise want action now. Senator Allen Ellender and Representative Harold Cooley, chairmen of the two Committees, both tell *Farm Journal* that they favor the appropriation. So do Senators Anderson of New Mexico, Hickenlooper of Iowa, Holland of Florida, Mundt of South Dakota, and Young of North Dakota—all members of the Senate Agriculture Committee.

In the House, these members of the Agriculture Committee told *Farm Journal* that the money should be appropriated now: Albert, Andresen, Bramblitt, Dague, Cathings, Grant, Hill, Hoeven,

Hope, Lind, Lovre, Patten, Poage, Simpson, Sutton, Thompson, and Wheeler.

Who, then, is opposed to the lab? Apparently nobody is, publicly, and if some groups are privately, it's time to smoke them out. Some beef cattlemen have been suspected of hoping privately that Argentina is never so clean that her beef could compete with ours; but even these men don't argue that we shouldn't protect our own livestock.

What's the Next Step?

The place for action to start is in the Appropriations Committees of Congress. All these Committees have to do is recommend that the money be appropriated. Congress would doubtless follow through. So our poll indicates.

Some might say that Government expenses, which are mostly for defense and foreign aid, are high now. But it's important to keep that defense machinery humming—with a healthy livestock industry that can continue to supply much of the food. The cost of the lab is less than that of building a Navy destroyer.

We have spent \$26½ billion in grants to foreign nations in the past 5 years. It might be argued that the cost of this lab—a drop in the bucket by comparison—is necessary for important work here at home. It's more than that: hardly anything we could do would help foreign countries more than setting up a really good foot-and-mouth laboratory here. The discoveries we could make would help foreign nations fight this crippling disease that is cutting down the food supply in ¾ of the world. And every case of foot-and-mouth that we help stamp out in foreign lands also reduces the threat to us.

No one knows when this shadowy disease will steal onto a farm—yours as easily as any other—and burst into a community epidemic, sending fine herds and life-long farm investments into burial trenches as it is doing in Canada now.

Even more serious than this is the bare fact that we're living in a jittery world. We are locked in a life-and-death struggle that sometimes breeds the lowest and most desperate tactics. The threat of an intentional foot-and-mouth national epidemic is too great a risk to do so little about.

The Potential Economic Impact of an Outbreak of Foot-and-Mouth Disease in Canada

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Abstract

The possibility of an outbreak of foot-and-mouth disease is of concern to Canada's livestock industry due to the resulting economic consequences. The primary economic impact of a foot-and-mouth disease outbreak would arise from the trade embargo placed on Canadian exports of animals and animal products to countries free of the disease. Agriculture Canada's Food and Agriculture Regional Model was used to estimate the economic impact of such a trade embargo. Two scenarios, a small and large outbreak, were simulated over a five year period (1986-90). The results indicate that even a small outbreak of foot-and-mouth disease would have serious economic consequences for the livestock sector with farm cash receipts declining by \$2 billion. The largest impact would be on the pork sector followed by the beef sector.

Key words: Foot-and-mouth disease, economic impact, export embargo.

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Introduction

The possibility of the introduction of foot-and-mouth disease (FMD) into Canada is of concern to everyone involved in the livestock industry. The highly contagious nature of FMD, its worldwide distribution, and its plurality of serotypes are features which have made it a major threat to

Résumé

Les conséquences économiques d'une épidémie éventuelle de fièvre aphteuse, au Canada

L'émergence de la fièvre aphteuse et les conséquences économiques qu'elle entraînerait au Canada constituent un sujet de préoccupation pour l'industrie du bétail. Une épidémie aurait de graves répercussions, puisque les pays exempts imposeraient immédiatement un embargo sur les importations d'animaux et de produits d'animaux, en provenance du Canada. On a utilisé le modèle régional du secteur agro-alimentaire du ministère de l'Agriculture du Canada, pour simuler les répercussions économiques d'un tel embargo. On a envisagé deux scénarios, sur une période de simulation de cinq ans (1986-90). Le premier suppose une épidémie de très faible ampleur et un embargo d'un an. Le second suppose une plus grave épidémie et un embargo d'un an et demi. Les résultats laissent croire qu'une épidémie, même mineure, aurait des répercussions économiques catastrophiques sur l'industrie de l'élevage, puisque les revenus de l'agriculture diminueraient de deux milliards de dollars. L'industrie porcine serait la plus touchée, suivie de l'industrie bovine.

Mots clés: fièvre aphteuse, impact économique, embargo sur les exportations.

the health of livestock around the world.

In Canada the only confirmed outbreak of FMD occurred in Saskatchewan in 1952. In total 1343 cattle

and 401 swine, sheep, and goats were slaughtered with an eradication cost of nearly \$1 million (1). However, the U.S. trade embargo of just over one year resulted in substantially higher costs for the country.

The international trade in meats is largely segregated into two markets resulting from the fact that countries free from FMD refuse to allow imports from regions with FMD (2). A consequence of an outbreak of FMD in Canada is that it would result in an immediate embargo on exports of animals and animal products to countries free of the disease, which include the United States and Japan. This would directly affect \$1.2 billion annually in exports, based on 1985 export values (3).

The loss in export sales would not necessarily reflect the true economic impact that would be felt by the agriculture sector. The economic impact of a trade embargo would depend on the size of the sector affected, the level of imports as well as exports, and linkages to various agricultural and other sectors of the economy. Estimation of the economic impact requires a dynamic model that incorporates interdependencies of products and prices and that allows for adjustments over time. In this study an econometric model was used to measure the economic effects and overall impact of an outbreak of FMD over a period of time.

Materials and Methods

The Food and Agriculture Regional Model (FARM), an econometric model maintained and operated by Agriculture Canada, was adapted for use in evaluating the impact of trade embargoes following a FMD outbreak. The Food and Agriculture Regional Model is a large-scale, multiple-equation model that represents in mathematical

cal terms the economic relationships describing the Canadian agri-food system.

The Food and Agriculture Regional Model was developed during the late 1970's under the co-ordination of Agriculture Canada. The development work on FARM was done by economists at Agriculture Canada, in Canadian universities, and other consultants under contract (4). A technical report (5) was issued in 1980 containing descriptions of the model as it existed at that time, as well as estimation and validation results. Since that time significant revisions have been made to various components of FARM and development work continues to make improvements in the model.

The major use of FARM by Agriculture Canada is in the provision of short-term (two year) forecasts that are provided on a quarterly basis. It is also used to prepare medium-term (five year) forecasts as well as to examine various policy alternatives. One example of FARM's use in policy analysis was in examining livestock stabilization programs (6). Agriculture Canada also maintains a computerized data base, termed FARM BANK, for use in FARM.

Most equations in FARM are estimated using ordinary least squares, although some equations are estimated using generalized least squares to correct for first-order serial correlation, and the acreage blocks for western and eastern Canada are estimated using Zellner's seemingly unrelated regression technique. Validation of individual components of FARM involved performing both an intra-sample (over the estimation period) and an extra-sample (beyond the estimation period) fully dynamic and simultaneous simulation. Statistics used to measure the validity of a given component typically include mean percentage error (a measure of bias) and root mean-square percentage error.

The FARM model, as used for this study, consisted of 655 equations divided into eight major components: cereals and oilseeds, red meats, poultry and eggs, dairy products, food prices and personal expenditures, farm income, farm inputs, and agricultural gross domestic product. For this study the red meats component is the one of primary interest. It is further subdivided into the beef and pork sectors (7). Both the beef and pork models

are divided into two regions (eastern Canada and western Canada) and two trade partners (United States and all other countries). Two other components of the FARM model, feed grains, and poultry and eggs, are particularly sensitive to the results generated by the red meats component. The inventory of livestock affects the demand for feed barley, and changes in red meat prices affect the demand for chicken, turkey, and eggs.

Description of Scenarios and Model Adjustments

Two scenarios were examined. Scenario 1 assumed a small outbreak of foot-and-mouth disease affecting ten to fifteen farms. Under this scenario the disease was quickly eliminated and involved the destruction and burial of 1500 to 2000 animals. Based on current practices all countries free of FMD are assumed to impose a complete embargo on imports of live animals and uncooked meat products from Canada for a period of one year.

Scenario 2 assumed that an outbreak of FMD occurs in eastern Canada and that the disease spreads quickly in Ontario and Quebec before controls become effective. Eradication of the FMD outbreak is assumed to require a six-month program, entailing the destruction of one percent of animals in eastern Canada. The embargo by other countries against Canadian livestock and meat exports is assumed to be in force for a year and a half.

The trade embargo was incorporated into FARM by setting the following export variables to zero: export of feeder cattle, calves, steers, heifers and hogs to the United States, export of beef and pork to the United States and all other countries. It is further assumed that the federal government would not close its border to meat products from other countries during the term of the embargo, and that the federal and provincial governments do not establish emergency economic measures to assist livestock producers. The scenarios were run over a five year period, 1986-1990. It was assumed that the embargo imposed by Canada's customers took effect on January 1, 1986 and ended on December 31, 1986 in the case of the first scenario and on June 30, 1987 in the case of the second. The trade embargo means that Canadian red meat prices would be

determined solely by supply and demand conditions within the country. According to FARM, Canadian red meat prices are largely determined by prices in the United States. Consequently, adjustments were required to FARM to sever the price linkages with the United States.

Results

The FARM model generated values for each of the 655 equations, many on a quarterly as well as annual basis. Only the main results, on a yearly basis, will be reported here.

The results indicate that a FMD outbreak would have a serious economic impact on the financial health of Canadian hog and cattle producers. Canadian agriculture would lose \$2 billion in the case of a one year embargo and \$2.8 billion if the embargo lasted six months longer (Table I). The hog industry would be the most affected with losses totalling \$1.1 and \$1.6 billion in the first and second scenarios respectively (Table II), including \$0.96 and \$1.46 billion during the term of the embargo. For the embargo period this represents a decline of 49% and 50% respectively from base-run values. Base-run values are essentially the medium-term (five year) forecast generated by the FARM model.

Cash receipts in the beef industry would fall by \$720 million and \$986 million in the first and second scenarios respectively, including \$638 million and \$913 million during the embargo period. This represents a decline from baseline values of 19% in 1986 under both scenarios and 17% in the first half of 1987, in the case of the second scenario. Producers of feeder calves, poultry, and feed grain (barley) would also be affected by the embargo (Table II).

The decline in cash receipts is attributable to the export embargo which would cause products destined for export to be diverted to the domestic market and this over supply situation would lead to substantial declines in commodity prices. Hog prices would fall 33% (scenario 1) or 31% (scenario 2) in 1986 and 43% in the first half of 1987, for the second scenario (Tables III and IV). The hog farm price reduction would cause retail pork prices to fall by an average 10%. In the beef industry cow prices would fall three times as much as steer prices

TABLE I

Decline in Farm Cash Receipts from Baserun, by Year

Year	Scenario 1		Scenario 2	
	Billion dollars	Percent	Billion dollars	Percent
1986	1.69	8.5	1.66	8.4
1987	0.24	1.2	1.01	5.5
1988	0.07	0.4	0.02	0.1
1989	+0.02	+0.1	0.05	0.3
1990	0.01	0.05	0.04	0.2
Total	2.00		2.78	

TABLE II

Decline in Farm Cash Receipts from Baserun, by Sector

Sector	Scenario 1		Scenario 2	
	Billion dollars	Percent	Billion dollars	Percent
Hog	1.15	57.5	1.64	59.0
Cattle	0.72	36.0	0.99	35.6
Feed Grain	0.05	2.5	0.06	2.2
Feeder Calves	0.04	2.0	0.05	1.8
Poultry	0.02	1.0	0.02	0.7
Other	0.02	1.0	0.02	0.7
Total	2.00	100.0	2.78	100.0

TABLE III

Percentage Change from Baserun of Selected Variables, Scenario 1

Variable	1986	1987	1988	1989	1990
	— Percent —				
Price of index					
100 hogs, Ontario	-32.7	-3.4	4.7	4.2	0.3
Price of D1.2 cows, Toronto	-32.4	0.8	0.7	0.3	-0.1
Price of A1.2 steers, Toronto	-11.1	-0.1	0.6	0.7	-0.1
Imports of beef (wt)	-72.9	-14.5	5.8	0	-0.4
Exports of beef to U.S.A. (wt)	-100.0	-21.6	-9.3	-3.3	2.3
Exports of pork (wt)	-100.0	-24.0	-22.0	-9.1	-4.0
Markings of hogs (no.)	0	-4.2	-4.8	-1.7	-0.3
Markings of bulls and cows (no.)	6.8	-1.6	-4.7	-1.8	-0.3
Per capita disappearance of meat	1.3	0	-0.3	-0.2	0
CPI food	-2.6	-0.1	0.1	0.1	0

TABLE IV

Percentage Change from Baserun of Selected Variables, Scenario 2

Variable	1986	1987 Q1.2*	1987 Q3.4*	1988	1989	1990
	— Percent —					
Price of index						
100 hogs, Ontario	-30.5	-43.0	-4.3	14.4	4.5	1.3
Price of D1.2 cows, Toronto	-32.1	-23.5	0.8	1.3	0.5	-0.1
Price of A1.2 steers, Toronto	-11.1	-9.2	0.1	0.1	1.2	0
Imports of beef (wt)	-73.3	-81.7	-14.1	9.7	0.6	-1.4
Exports of beef to U.S.A. (wt)	-100.0	-100.0	-24.9	-15.6	-6.8	1.4
Exports of pork (wt)	-100.0	-100.0	-42.0	-41.0	-22.5	-12.4
Markings of hogs (no.)	-0.3	-19.0	-9.0	-10.1	-5.0	-2.4
Markings of bulls and cows (no.)	6.1	5.2	-1.6	-6.8	-3.3	-0.2
Per capita disappearance of meat	1.3	1.0	0.1	-0.5	-0.3	-0.1
CPI food	-2.6	-2.6	0	0.3	0.1	0

*Refers to quarters of the year

due mainly to the fact that a much larger proportion of Canada's beef exports are of cows and cow meat. These lower cattle prices would cause retail prices of high-quality beef (steaks, roasts) to fall 7.5% and low quality beef (hamburger) to fall 30%.

Consumption of high-quality beef would be affected very little, since the price of substitutes (low quality beef and pork) would fall more than the price of high-quality beef. Consumption of low-quality beef would rise sharply, during the embargo period, by an average of 7.8% (scenario 1). Pork consumption for 1986 would increase by 1.8% and 1.5% for scenarios 1 and 2 respectively.

The export embargo results in a surplus of pork of 237 million kilograms or 34% of the domestic market for 1986. The surplus of beef is 123 million kilograms or 14% of the domestic market. The baserun forecast is that Canada would import 114 million kilograms of beef in 1986. Therefore, a large portion of the surplus could be eliminated through a reduction in imports. The model predicts declines of 80% in imports of low quality beef and 70% in high quality beef. The remainder of surplus reduction would come from a decline in the average weight of steer and heifer carcasses and a drop in steer sales. The situation with pork differs in that pork imports are negligible. Therefore, elimination of the pork surplus would be achieved chiefly through marketing of hogs at lower weight initially, and then through lower production. Hog sales in Canada would return to the level established in the baserun scenario only in 1990 in scenario 1 (Figure 1) and would still not have reached that level by 1990 in scenario 2.

The size of the cattle breeding herd would be affected by the embargo. A fall in steer prices would lead to a decline in feeder calf prices. This would have short and long-term effects. On a short term basis calf slaughterings would rise by an average of 14% in 1986. Inventories of steers and heifers would fall by the second quarter of 1986. Sales of steers would drop, but sales of heifers would increase slightly, since a smaller percentage would be kept for breeding purposes. For scenario 1 sales of cows between the second quarter of 1986 and the first quarter of 1987 would be on average 8% higher than the

level established in the baserun forecast. Over the longer term an increase in sales of females during the embargo would lead to a reduction in the number of breeding animals in inventory, calf births, the number of calves becoming cattle, the number of steers and heifers in inventory, and sales of all types of cattle. As a result, cattle prices would be slightly higher or equal to those in the baserun forecast in the years following the embargo and exports would return to baserun levels only by 1990.

While the impact of the trade embargo is felt mainly by beef and pork producers, as noted in Table II, poultry and feed grain producers are also affected. The decrease in pork and beef retail prices cause chicken consumption to fall 2.4%, under both scenarios, which results in a decline in chicken production. In the case of feed grains, reduced livestock production reduces the demand for feed barley, particularly in western Canada.

Finally, the only group that would gain in the event of a FMD outbreak would be consumers. Because of the lower retail prices for red meats, the food Consumer Price Index is predicted to fall 2.6% during the term of the embargo. Total meat consumption would increase 1 to 1.3% during the same period.

Discussion

Canada's policy in the event of an outbreak of FMD is to eradicate or "stamp out" the disease as quickly as possible (8). This is accomplished through a program of quarantine and restriction of livestock and agricultural product movement in the outbreak areas, the slaughter and burial of all infected and exposed animals, the disinfection of infected premises, and indemnification of producers.

Economic analyses have been undertaken in other countries of both actual FMD eradication programs (9, 10) and potential FMD outbreak situations (11, 12). In all instances the benefit-cost ratio was substantially greater than one. Canadian studies have also demonstrated the benefits of keeping diseases such as African swine fever (13) and anaplasmosis (14) out of the country.

There are a number of limitations in the model and in the study. Apart from the federal hog stabilization program established under the Agricul-

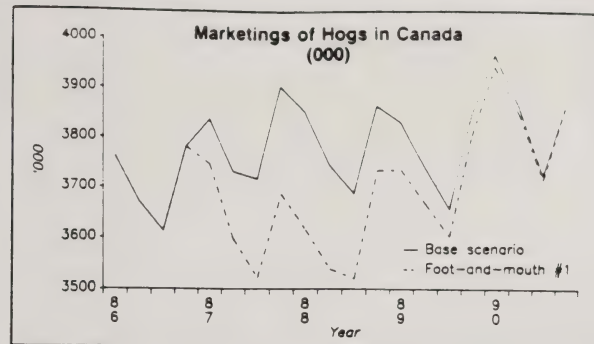


Figure 1. A comparison of number of hogs marketed in Canada following an outbreak of foot-and-mouth disease (Scenario 1) versus no outbreak (Base run).

tural Stabilization Act (ASA), all other provincial and federal programs are not included in the FARM model. The model assumes that producer's anticipated prices correspond to the market price in the current period. In reality, if producers were aware of the length of the embargo they would not consider the price during the embargo period as a good approximation of prices following the lifting of the embargo. These two limitations would tend to an overstatement of the economic impact. On the other hand, the model does not include trade in purebred animals and embryos, which would be subject to an embargo; this tends to understate the impact. The model results should be viewed as indicative rather than definitive. The magnitude of the impact predicted, especially in the period following the outbreak, indicates that a chaotic marketing situation will exist. Such a situation strains the limits of the model's ability to predict with any accuracy the economic consequences. Nevertheless, the results generated by the model were consistent with expectations, given the assumptions made.

Under both scenarios it was assumed that the federal government would not close the border to meat products from other countries during the term of the embargo. Furthermore, it was assumed that the federal and provincial governments do not establish emergency economic measures to assist livestock producers. These assumptions are not likely realistic given that in 1952 the federal government did close the border to meat products from other countries and took various actions to try

to support prices. Nevertheless, these assumptions permitted an estimation of the economic impact of the trade embargo in the absence of government reaction (other than the eradication program), which is in any event rather difficult to predict. Therefore, the study does not try to predict what will happen in the event of a FMD outbreak, but rather what the economic consequences would be if no action was taken by the government.

The costs of a FMD outbreak in a given country depend on several factors, including gravity in terms of number of animals infected and also the trade situation. If the country in question does not export any meat or meat products the only costs of such an epidemic are related to the costs of eradicating the disease. However, if the country exports a large percentage of its domestic production, the costs of such an epidemic may be enormous. The results of this study demonstrate that even for a small FMD outbreak, quickly controlled, where eradication costs would be small (in the order of \$2 million) the economic impact on producers would be in the order of \$2 billion. Furthermore, the results demonstrate that the impact is larger than merely the loss of export sales due to the significant impact on all domestic meat prices.

If a FMD outbreak were to occur today it would have a much more serious impact than the 1952 outbreak. The reason for this is that in 1952 Canada's exports of livestock and livestock products were more limited and only beef producers were affected (pork exports were not significant in 1952). This study illustrates that pork

producers would now be affected to an even greater extent than beet producers.

The question arises as to what will happen when foreign markets re-open. The model predicts that Canada will not have sufficient supplies to fully recapture lost foreign markets. Thus the constraint appears to be on the supply, rather than on the demand side. It is believed that export demand for Canadian animals and animal products will recover quickly, especially with favorable prices. The experience following a FMD outbreak in Denmark was that following the termination of the embargo the Danes quickly recaptured their share of the Japanese pork market.

The study demonstrates that the rapid eradication of a FMD outbreak is desirable. Even a six month extension of the embargo period will result in increased losses to producers of the magnitude of \$760 million. Any eradication program which may increase the length of the embargo period (such as using a vaccination program) would not be economically justified as long as a strict slaughter policy is technically feasible.

An implication of the study is that an immediate embargo by Canada on imports of livestock and livestock products, to protect the domestic market, would by itself have little addi-

tional benefit in protecting domestic pork producers, but would provide some protection to beet producers. However, such a program combined with a policy to guarantee or set a floor price for livestock would serve to limit the decline in farm cash receipts. This would be at the expense of those gains identified for consumers.

Finally, this study, consistent with other studies, indicates that Canada's program of keeping out foreign animal diseases is a valuable service.

Acknowledgments

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SECRETARY'S ADVISORY COMMITTEE
ON FOREIGN ANIMAL AND POULTRY DISEASES

Colony Inn Hotel
1157 Chapel Street
New Haven, CT 96511
203 776-1234

Ball Room

August 16, 1989

6:30 a.m.	Buffet Breakfast	Hotel Restaurant
8:00 a.m. - 9:15 a.m.	New Diagnostics	Dr. Al Strating Director, Science and Technology
	Change in Basic Services Animal Import/Export	Dr. Lonnie J. King Deputy Administrator, Veterinary Services
	Global Perspective	Dr. Alex Thiermann Deputy Administrator International Services
	Environmental Impact Statement	Dr. James W. Glosser Administrator, APHIS
9:15 a.m. - 9:45 a.m.	Group Discussion	
9:45 a.m. - 10:00 a.m.	Break	
10:00 a.m. - 11:30 a.m.	Research Initiatives New Technology	Dr. Roger Breeze, PIADC Fred Brown, PIADC
	Panel Discussion	Plum Island Scientists
11:30 a.m. - 12:00 noon	Group Discussion	
12:00 p.m. - 1:00 p.m.	Lunch	Ball Room East
1:00 p.m. - 3:00 p.m.	LLamas	Dr. Phyllis M. York Director, Recruitment and Development (Facilitator)
3:00 p.m. - 3:15 p.m.	Break	
3:15 p.m. - 5:00 p.m.	Open Discussion	

SUBJECT: Foreign Animal Diseases Preparedness and Responsiveness

ISSUE: Managing activities to prevent the introduction of exotic animal diseases (import-export), detect an introduction as soon as possible, and initiating appropriate response to eliminate the exotic disease from the U.S. with due consideration for economics, technical methodology, and political sensitivities.

DISCUSSION: There are two basic phases of management for foreign animal diseases activities, "before" an outbreak and "during" an outbreak. If the "before" planning is not adequate, there is little hope for rapidly initiating a large emergency effort.

Disease control program activities in the field must be interwoven into current industry production and marketing practices and supported by strong backing from industry and public officials. APHIS personnel must conduct the necessary planning and analysis to identify the duties and responsibilities of federal, state, and industry during an emergency. Without good planning, the forces may be pulling in opposite directions during emergencies. We must stay current on industry practices.

The reorganized APHIS will be much more prepared than the old organization. There are more people with a greater variety of expertise in essential areas that the Administrator can assign to planning or operations.

SUMMARY: Most of the concepts and policies for Emergency Programs evolved in the late 1940's and early 50's following a prolonged massive outbreak of foot and mouth disease in Mexico and a smaller one in Canada. A study was conducted to identify changes in animal health, production, marketing, and outlook that has occurred since the 1950's and that would affect an emergency program.

In the health area there are better diagnostic tests, improved vaccines, and many more excellent laboratories. However, many of the concepts and policies formulated in the 50's are as sound today as then.

Production and marketing has changed drastically. Efficiency has made giant strides, but timing is critical. Prolonged quarantines would be far more disruptive than years ago.

Public attitude toward emergency animal disease eradication program appears to be favorable, but perhaps not as strong as when export expectations were higher.

The political process for initiating and sustaining an emergency program has become more complicated and requires increased personnel with diverse expertise. Regulation development is complex and time consuming. There is much concern for the environment which may be confronted when burying and burning carcasses or spraying insecticides or disinfectants. Humane care of animals must never be ignored, even while they are being depopulated. Budgeting for exotic disease monitoring and for emergencies is not as clear-cut as in the past. Advanced planning is far more important now than earlier.

PREPARED BY: H. A. McDaniel

SUBJECT: Veterinary Services Infra-Structure for Foreign Animal Diseases

ISSUE: An outbreak of highly contagious and infectious viral exotic animal diseases such as foot-and-mouth disease, African swine fever, hog cholera, Rift Valley fever, African horse sickness, Venezuelan equine encephalitis, and many others, could decimate our livestock industry. In addition, several diseases of poultry, including exotic Newcastle disease, highly pathogenic avian influenza, and others, could have a negative and adverse impact on the poultry industry, the citizens, and consumers of our nation. In order to deal with an outbreak of an exotic disease, it is essential to have well-trained and experienced personnel in the U.S. Department of Agriculture (USDA). It is extremely critical to have a sufficient nucleus of well-trained and competent personnel for an infra-structure that could rapidly take charge, effectively direct operations, and perform the duties which would be required to bring an outbreak to a successful conclusion.

DISCUSSION: During the past 18 years, the numbers of experienced, permanent employees in Veterinary Services, Animal and Plant Health Inspection Service, USDA, have declined from approximately 3500 to a current level of approximately 1500 employees. It is essential that an infra-structure of permanent, trained personnel be maintained to control and eliminate outbreaks. In addition to personnel needs at the outbreak site(s), a sufficient number would be required in each State for surveillance and other activities. Sufficient numbers of veterinarians who are specifically trained in the recognition and diagnosis of foreign animal diseases are needed to investigate suspicious cases that are currently being reported each year. These requirements would increase during an outbreak.

During the outbreaks of hog cholera in 1976 in New Jersey and New England, over 150 personnel were needed at the outbreak sites. In addition, swine, pork, and pork products were traced to receiving States. Inspections of swine being fed food waste were intensified all over the nation and especially in those high risk States. Increased inspections and standards at approved swine markets were also increased. Regulation compliance, supervision, surveillance, investigations, epidemiological functions, cleaning and disinfection of vehicles and premises, and other activities such as national staffing and recordkeeping were necessary. In the final stages of eradication, outbreaks occurred in Mississippi, Texas, New Jersey, Rhode Island, and Massachusetts within months of other outbreaks. Recrudescences occurred in New Jersey and New England within a few months of preceding cases. These activities all increased the requirements for trained, perceptive, and knowledgeable personnel.

SUMMARY: An infra-structure of permanent, well-trained personnel must be maintained to deal not only with activities at disease outbreak site(s), but to conduct activities which must be performed throughout the United States when a national disease emergency is declared by the Secretary. Temporary employees and employees from other Agencies have and can contribute substantially; however, it requires the leadership, dedication, knowledge, experience, and technical competence of permanent employees to maintain the legacy of this nation's status of being free of devastating foreign animal diseases.

Prepared by: M. A. Mixson, Chief Staff Veterinarian, Emergency Programs,
Veterinary Services.

Subject: Animal Health Program in Haiti

Issue: Animal disease surveillance and diagnostic laboratory activities in Haiti.

Discussion: Due to the outbreak of African Swine Fever (ASF) on the island of Hispaniola in 1979, a complete eradication of the swine population was undertaken with predominantly United States funding. Since the presence and eradication of ASF, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) has considered swine disease surveillance and diagnosis an essential activity to prevent recurrence of an exotic disease in the repopulated swine and to protect livestock industry of the United States. Because of the potential danger to the United States, APHIS maintained one Veterinary Medical Officer (VMO) in the country of Haiti from November 1986 until September 1988. An essential element of the animal health program in Haiti is the establishment of a functional diagnostic laboratory in the facilities constructed by USDA in 1985 with the capability of providing definitive diagnosis of diseases exotic to the United States. A senior APHIS laboratory specialist initiated the establishment of the laboratory in November 1986 on an intermittent basis. In December 1987, there was a policy change which eliminated all direct U.S. Government aid to the Government of Haiti. The USDA personnel were declared nonessential and were under a mandatory departure from Haiti along with all dependents.

Summary: Congressional permission to cooperate with Haiti when in the interest of the United States was obtained in late July 1989. The laboratory specialist position can now be established. The laboratory has been completely furnished and ninety percent of the equipment has been purchased and installed. Only a water purification system and an emergency generator remain to be obtained. It is envisioned that the laboratory specialist will be selected and briefed on the position by September 1989.

Prepared by: Dr. A. B. Thiermann, Deputy Administrator
International Services

Subject: Bovine Spongiform Encephalopathy

Issue: Action should be taken by the U.S. Department of Agriculture regarding bovine spongiform encephalopathy (BSE) concerning the potential threat that BSE may pose should it gain entrance into, or be diagnosed in the United States.

Discussion: BSE in domestic cattle was first diagnosed in November of 1986 in England. The disease is characterized by grey matter spongiosis and neuronal vacuolation. The clinical signs of BSE are mainly neurological. It has an insidious onset, slow progress, and fatal outcome. A preliminary report of initial cases of the disorder suggested that it had a close similarity to scrapie of sheep and proposed the name "BSE". Epidemiological studies implicate a point source of rendered products of sheep origin. Sporadic cases continued to be reported in 1987, and by the end of the year, over 100 cases had been confirmed from most parts of Great Britain. By mid-1988, the incidence of BSE had risen to 500 confirmed cases among a total adult cattle population of 4 million. In June of 1988, the United Kingdom legislated BSE as a notifiable disease. Ireland has reported two confirmed cases of BSE.

There have been no reports of a similar natural disease of cattle in the United States. APHIS is in the process of collecting information and monitoring the number of cattle, sheep, and goats imported from the United Kingdom and Republic of Ireland into the United States since 1983.

USDA has requested the United Kingdom amend the health certificates for the export of cattle, bovine semen, and bovine embryos to reflect a statement that, "The animals, and or donor animals, have not been exposed to, nor are they genetically related to, any animal which is currently exhibiting, or has exhibited clinical signs of BSE."

Summary: Due to its similarity to scrapie and fatal prion diseases in humans, APHIS needs to conduct an epidemiological investigation of animals imported into the United States from the United Kingdom and Republic of Ireland and to assemble and evaluate information on the amount and origin of rendered animal products and livestock feed entering the United States.

Diagnostic laboratories must be alerted to the clinical symptoms and histopathological lesions and encouraged to submit tissue samples with lesions compatible with those of BSE to the National Veterinary Services Laboratories for confirmation. These should all be done in conjunction with a risk analysis.

Prepared by: Dr. A. B. Thiermann, Deputy Administrator
International Services

Subject: Central American emergency animal disease preparedness.

Issue: Foreign animal disease surveillance in Central America receives very low in-country priority, therefore, the risk of disease introduction into Central America and the United States through imported fresh or frozen meat is dramatically increased.

Discussion: Central American countries are poorly prepared for coping with the entrance of foot-and-mouth disease (FMD) and other foreign animal diseases (FAD). There are neither funding sources for emergency equipment, supplies, personnel, etc., nor infrastructure of communication and cooperation among the various ministries which would result in a coordinated effort to control or eradicate a FAD introduction. If a FAD were introduced into Central America it would be necessary for the United States (USDA) to assume the principle role in any eradication campaign if the FAD were to be controlled or eradicated.

The FMD status of these countries has a direct impact on the exportation of fresh and frozen meat into the United States. Currently, there is no policy in place to monitor existing disease surveillance systems in these countries to ensure that they remain free of FMD, nor are there any minimum criteria for such a surveillance system. Consequently, in certain countries, disease surveillance systems receive a very low priority despite the presence of APHIS personnel. This presents a direct threat of foreign disease introduction to the United States because of the importation of fresh and frozen meat products from these countries.

Summary: U.S. FMD and FAD prevention programs could be strengthened by linking FMD and FAD surveillance in Central America with meat exports to the United States. USDA-APHIS-IS Attaches could be utilized to approve and monitor the minimum criteria necessary for surveillance systems in Central American countries from existing in-country locations.

The United States (USDA-APHIS) could also participate in a FAD emergency preparedness exercise in Central America. This exercise would include the military of both countries, APHIS personnel, and all involved ministries in the host country. This would establish the necessary communication, cooperation and infrastructure that would be required in any FAD introduction into Central America.

Prepared by: A. B. Thiermann, Deputy Administrator
International Services

SUBJECT: Change in Basic Services in the Future

ISSUE: A combination of events is occurring which requires Veterinary Services (VS) to respond to new constituents and the changing needs of its established constituents while experiencing the reduction of traditional disease programs.

DISCUSSION: Traditional approaches to animal disease control and eradication are being challenged by an informed constituency which emphasizes sound scientific and legal reasoning in decision making. Animal industries are becoming large, sophisticated, and vertically integrated. Demands for reliable information are unprecedented because industry decisions on animal health issues have greater economic importance. The definition of disease has expanded in both etiology and health effects, such as metabolic, chronic, immunodeficient, nutritional, environmental, subclinical, and production diseases. Therefore, the narrow concept of disease as a result of a simple infectious agent is no longer accurate, suggesting that profound changes are needed in prevention, control, and eradication strategies. Colleges of veterinary medicine continue to emphasize clinical disease, limiting future availability of veterinarians to address the needed measures of disease prevention, biosecurity, epidemiology, and food animal health maintenance. Pressure is mounting on Government to apply these measures to the nation's herds and flocks. The use of Government resources, knowledge, and leadership to resolve such problems is drastically needed. In the face of these increasing demands and the reduced Federal agricultural budget, major disease eradication programs are precluded in the future.

The association between animal diseases and public health is well documented and is being publicly and politically acknowledged. The American consumer is demanding a safe and wholesome food supply free from microbiological and chemical contaminants and low in fats and cholesterol. VS must adequately define these and other emerging animal and human health issues.

SUMMARY: To be responsive to the animal health needs of the 1990's and beyond, VS must focus attention from traditional program activities to prevention, elimination, or control of economically significant problems supported by a wider constituency. A national animal health surveillance system, established to define problems, develop intervention strategies, and implement on-farm certification programs, will enhance agricultural marketing and production efficiency. Changing statutory authorities and redefining the definition of disease can initiate food safety activities.

VS must be granted the authority to initiate applied research and development of better diagnostic test procedures and provide for more in-depth disease risk assessment in the international marketplace. Biotechnology can enhance disease control strategies and improve diagnostic tools.

The scientific and technical base of VS must be quickly expanded by providing appropriate training to the current workforce and by actively recruiting from outside the Agency to establish centers of excellence, such as, a germ plasm center, centers for epidemiology and animal health, and a center for import-export. VS must also expand expertise in the emerging food industries, such as, "fish farming" or aquaculture.

Prepared by: Dr. R. L. Rissler, Acting Director, Operational Support, Veterinary Services.

Subject: The Completion of the Pan-American Highway

Issue: Despite an extended cessation in construction of the Darien Gap portion of the Pan-American Highway there is growing interest to coincide its completion with the 500th anniversary of the discovery of the Americas.

Discussion: During 1972, the Ministry of Agriculture and Livestock of the Republic of Panama (MIDA) and the United States Department of Agriculture (USDA) signed a Cooperative Agreement for the Prevention of Foot-and-Mouth Disease (FMD) and Rinderpest. During 1973, the Ministry of Agriculture of Colombia (MOA) and USDA signed an agreement establishing a program designed to control and eradicate FMD in certain portions of Northwest Colombia, and to prevent the dissemination of this disease from Colombia as a result of construction of the Darien Gap highway. As a result of the construction of the Darien Gap highway, MIDA and USDA in 1974 amended the agreement to provide for the establishment of a Commission.

Of the entire Pan-American highway system the only unfinished part is the Darien Gap section in Panama and Colombia. Steady progress was made towards the completion of the one unfinished section until the early 1980's when construction came to a halt due principally to escalating construction costs and diminishing financial resources. In 1970 the United States agreed to cooperate with the governments of Panama and Colombia in the completion of the Darien Gap section. The United States agreed to two thirds of the financial responsibility. However, in 1978, the Sierra Club, the National Audubon Society, Friends of the Earth, Inc., and the International Association of Game, Fish, and Conservation Commissioners obtained an injunction from the U.S. Court of Appeals that prevented the U.S. government from further participation in the construction of the Darien Gap highway in Colombia until USDA certifies that an effective FMD control program is established in that country.

In October of 1986, the XV Pan-American Highway Congress was held in Mexico City. There were many calls for all member countries to make a commitment and to participate in finishing the last section.

Summary: After a lapse of several years, Colombia is requesting United States funding to resume construction of the Darien Gap portion. The U.S. Department of Transportation recently received a letter from the Colombian Minister of Public Works stating that an effective FMD control program now exists in Colombia, and highway construction should be resumed as soon as possible. The Colombian Director of the ICA-USDA FMD Program has been asked to comment on the effectiveness of the program, specifically addressing the minimum criteria that must be met before the USDA can give its certification.

The USDA-APHIS Representative has been told by Embassy officials that the U.S. Embassy in Colombia is opposed to any use of United States funds for the completion of the highway for the obvious problems associated with drug movements northward. It is felt there that the completion of the highway is highly unlikely for that reason.

Subject: Deterioration of Animal Disease Control Systems in the Developing World

Issue: In many parts of the Third World, particularly in Africa, there is an apparent deterioration in animal disease control within the past decade. This deterioration results in an increased risk to the livestock industries of the developed world. This risk is exacerbated by the concomitant ease and speed of international travel from the Third World.

Discussion: The deterioration in animal disease control has a multiplicity of causes; however, the major cause is the lack of national financial resources to maintain control programs which are often inherently expensive. Funds for vehicles, vaccines, and drugs are extremely limited. This scarcity is compounded by the large increase in local personnel numbers. Many countries have a policy of guaranteed employment for all graduating veterinary and livestock officials so some 95+ percent of budget goes to salaries with little or no provision for tools and supplies to do the job. As a corollary of this, government salaries are generally very low, many officers have jobs in the private sector to provide for their families. These jobs take precedence. The small salaries and lack of equipment lead to low morale and often corruption. In both cases, the official service suffers.

Many of the States are headed by military despots and the higher echelons of government have little understanding of agriculture. The Veterinary Services, with only a few exceptions, have little political clout and influence. Though compulsory vaccination and quarantine laws may be on the books, local officials and police are largely unaware of such regulations and, even when they are, often countermand the veterinary office for political or financial reasons. Civil war and starvation leads to massive movement of peoples and animals. The unrestricted movement of animals throughout most countries in Africa is now the norm. Local political strength may result in regionalization and dispersion of veterinary authority. In the Philippines a regional structure is being adopted with separate autonomy. This will result in little uniformity of regulations and "turf battles." The results of such a system can be seen in Italy and its subsequent lack of success in controlling foot-and-mouth disease.

Summary: For numerous reasons, animal disease control systems have deteriorated in many developing countries. One result of this neglect and lack of resources is the almost uninhibited manifestation of disease, resulting in an increased risk to the livestock industries of the more developed nations. As a result, APHIS needs to strengthen and sharpen its surveillance activities at ports of entry and in foreign countries.

Prepared by: Dr. A. B. Thiermann, Deputy Administrator
International Services

Subject: Deterioration of Animal Health Services in Mexico

Issue: Animal Health Services have been steadily deteriorating in Mexico for some time. Due to this deterioration, several animal diseases exotic to the United States and some near eradication have been allowed to proliferate, increasing disease risk especially in the United States southwest.

Discussion: Because of a government-wide decentralization in Mexico some six years ago, and an increasingly difficult economic situation, the animal health services have been progressively deteriorating. Because of lack of funds, many experienced personnel have left government employment, few vehicles are operable, and most programs do not have the operating funds to provide adequate service. Particularly affected are the traditional emergency services that could deal with animal disease outbreaks such as those caused by hog cholera, and regular service programs that operate such programs as bovine tuberculosis and brucellosis control and animal quarantine services in airports, seaports and border stations. Another program that has suffered a sharp decline is the cattle fever tick eradication program, which is now virtually at a standstill in regard to government operation.

This situation should be of considerable concern to United States interests because of the risk inherent in the possibility of introduction of serious disease problems into the United States particularly hog cholera, bovine tuberculosis, Velogenic Viscerotropic Newcastle Disease and others.

Summary: The new Mexican administration which took over the services six months ago is aware of the decreased surveillance and deterioration in animal health services, and is making an effort to correct it. However, it is doubtful that much can be accomplished for some time because of the current shortage of funds and the difficulty of replacing the critical personnel that have left the government.

Prepared by: Dr. A. B. Thiermann, Deputy Administrator
International Services

Subject: Disease Risks to U.S. Aquaculture industry from imported live aquatic species, germplasm, and processed fish and invertebrates

Issue: Imported aquatic species, germplasm, and processed products derived from fish and invertebrates represent a disease risk to United States aquaculture industries. Animal and Plant Health Inspection Service (APHIS) needs to evaluate these disease risks and take action to minimize the threat of introducing diseases that could cause serious economic harm.

Discussion: Aside from attempts by the U.S. Department of Interior, and Fish and Wildlife Service to keep out viral hemorrhagic septicemia (VHS) and Whirling disease, there are no federal requirements to prohibit the importation of diseased fish and invertebrates. Surprisingly, there is also no authority to prevent researchers from importing the pathogens and parasites themselves. Most developed countries which value aquaculture restrict the importation of live aquatic species, germplasm, pathogens, and pests that could cause economic harm. Some countries, such as Canada, also restrict the importation of products and byproducts derived from aquatic species since exotic disease agents can survive in chilled and frozen products such as eviscerated whole trout or fillets.

Not only has US import control of aquatic species been weak, export certification for aquatic species, germplasm, and processed aquatic products has been poorly managed. Because of deficiencies in United States export certification, the United States has exported a variety of disease agents and pests to foreign countries.

APHIS has the responsibility to protect the growing United States aquaculture industries against the importation of exotic disease agents and pests; however, the authorities and funding for aquaculture involvement have not yet been established. APHIS has submitted a proposal to obtain funding in Fiscal Year (FY) 1991 to begin aquaculture planning. APHIS is also attempting to amend existing regulations to provide authority for regulating aquatic species.

If FY 91 aquaculture planning money is approved, APHIS International Services would: 1) Meet with foreign veterinary officials to obtain overseas regulations, and policies governing control and eradication procedures for diseases/pests of aquatic animal species; 2) Obtain requirements from other countries that import live aquatic species, germplasm and processed aquatic animals to determine if APHIS can fulfill export certification and test requirements; and 3) Compile current list of diseases/pests of aquatic species which are foreign to the United States.

Summary: Currently, APHIS has no restrictions on the importation of live aquatic animal species, germplasm, and processed fish and invertebrates even though it is recognized that such importations represent a serious disease risk to United States aquaculture industries. APHIS, International Services needs to evaluate import-export requirements of foreign countries and develop an accurate list of diseases/pests of aquatic species that are foreign to the United States.

Subject: Embryo transfer

Issue: Risk of disease transmission through embryo transfer

Discussion: The procedures and responsibilities of Animal and Plant Health Inspection Service (APHIS) in embryo transfer involves certification for export and regulations for import. It is expected that embryo exports will expand and become a major percentage of the expanding U.S. animal export market. To adequately address this issue, APHIS has established an advisory committee which develops recommendations for the administrator on the potential risks of specific diseases being transmitted through embryo transfer. To date, the administrator has established the following basic restrictions as APHIS policy.

1. For the diseases of leukosis and bluetongue in bovine embryos follow International Embryo Transfer Society (IETS) recommendations only.
2. For foot-and-mouth disease (FMD) in bovine embryo-test donor cow twice under official supervision.

Recommendations on FMD, scrapie and bluetongue in ovine and caprine embryos, as well as brucellosis and tuberculosis in bovine embryos were developed by the committee in early July and forwarded to the administrator. These will be reviewed and a policy developed in the next several months.

APHIS also agrees with the standards outlined by the International Embryo Transfer Society and the American Embryo Transfer Association for embryo transfer. These include preparation of sterile media, sterilization of equipment, washing procedure for embryos, freezing and thawing procedures, embryo isolation, embryo evaluation and embryo recovery.

Summary: The United States and other countries require a variety of tests on the donor animals to decrease disease transfer risks. As more research is conducted, the risk on disease transmission will be more correctly identified. The tests and restrictions should reflect that knowledge. Therefore, APHIS should support and encourage additional research and initiate changes in the import/export requirements accordingly.

Prepared by: Dr. M. J. Gilsdorf, Senior Staff Epidemiologist,
Operational Support, International Services

SUBJECT: Emergency Planning and Risk Assessment

ISSUE:

There are many factors that threaten the health, and therefore the productivity, of this nation's herds and flocks. To efficiently protect our animal industries we must first assess the probability of a threatened occurrence and the magnitude of the loss it might cause. These risk assessments will help identify which factors we should consider first in our planning.

Some of these factors (exotic disease agents, widespread feed contamination, natural disasters etc.) will require an emergency response. An important component of the preparation for such emergencies is a well developed plan. This plan must provide, at the least, action options for the prevention, detection and containment of the emergency agent.

DISCUSSION:

Recognizing the need for risk assessments and detailed emergency plans, the Animal and Plant Health Inspection Service (APHIS) has created in the Animal Health and Depredation Management Systems (AHDMS) staff. AHDMS is an interdisciplinary team of animal health professionals who will develop and adapt risk assessment and emergency planning methodologies to the specific needs of Veterinary Services and Animal Damage Control programs.

Concurrently with the development of the methodology for conducting useful risk assessments, this team plans to assess the risk to our animal health posed by foot-and-mouth disease (FMD). The team will draw upon the current literature, the counsel of experts and government reports to estimate the probabilities associated with the various portals of entry of this virus. The present and future world situation will be examined and the assistance of economists will be obtained in evaluating the impact of this agent were it to occur in a number of scenarios.

The methodology for the development of emergency plans will be developed concurrently with the expansion of current plans for managing an outbreak of FMD. Again, a number of scenarios will be examined. A number of alternative actions, together with estimates of costs, benefits and environmental impacts will be made available to APHIS management.

Conceptually, these plans will be dynamic because they will be supported by available computer technology. Therefore, they will be easily updated as the world incidence of the disease changes or new international trading patterns evolve. These plans can make use of simulation models of animal and commodity movement to assist in selecting containment options and focusing surveillance activities.

SUMMARY:

Risk assessments will indicate which risks we can effectively manage and emergency plans will enable us to manage these risks efficiently.

PREPARED BY: John A. Acree, Senior Staff Officer, USDA, APHIS, AHDMS

SUBJECT: Exotic Newcastle Disease (Velogenic Viscerotropic Newcastle Disease)

ISSUE: Exotic Newcastle disease remains a significant threat to the poultry and pet bird industries of the United States. In 1972, it was estimated that if it spread Nationwide, it would cost a minimum of \$230 million per year indefinitely.

DISCUSSION: A major outbreak of exotic Newcastle disease involving poultry occurred in southern California in 1971. This outbreak was eliminated in 1973 at a cost of \$56 million. The last outbreak in commercial poultry occurred in 1974 and was promptly eliminated. Each year since 1971, with the exception of 2 years, the disease has been introduced into the United States by pet birds which apparently entered the United States contrary to regulations.

In 1987, the disease was diagnosed in pet birds on 15 premises in 10 different States. In 1986, six cases were confirmed in five States with no involvement of birds in commercial trade channels. In 1989, two cases were confirmed on two dealers' premises in Connecticut. Evidence indicated that the infected birds originated in Texas and were shipped to Connecticut. Pet birds in California which were seized by agents of the Fish and Wildlife Service, the U.S. Department of the Interior, were confirmed as having exotic Newcastle disease after they were placed in a USDA-approved quarantine facility.

During the past 3 years, efforts have been made each fall and winter to publicize the dangers inherent in smuggled birds. Press releases, fact sheets, program aids, feature stories, and other information have been provided to the print, news media, bird owners, bird clubs, the public, trade and bird organizations, airlines, U.S. Customs, and other Agencies. In addition, interviews have been conducted with the radio and television media.

Several arrests and convictions for smuggling pet birds have also been made as a result of the cooperation of USDA, the Fish and Wildlife Service, and U.S. Customs. Publicity and convictions pertaining to smuggled birds appear to have been productive and will be continued.

SUMMARY: Exotic Newcastle disease remains a major threat to the poultry and pet bird industries. Commercial poultry have not been infected since 1974; however, pet birds have been found to be infected each year with the exception of 2 years since 1971. Young pet birds are apparently smuggled into the United States each spring after hatching. An intensive campaign to prevent the introduction of the disease in smuggled birds has been conducted since 1987. The number of infected pet birds and confirmed cases have decreased during the past 3 years. The campaigns and increased enforcement efforts will be continued in an effort to remove smuggled birds as a source of exotic Newcastle disease.

Prepared by: M. A. Mixson, Chief Staff Veterinarian, Emergency Programs,
Veterinary Services.

SUBJECT: Exotic Ticks and the Importation of Animals

ISSUE: Veterinary Services began compiling and publishing records on exotic ticks found on animals imported into the United States in 1962. Since that time, 64 species of exotic ticks, representing 8 different genera, have been collected from a wide variety of both domestic and zoological animals imported into the United States. If they were to become established, some of these ticks could become serious pests of our nation's livestock population.

DISCUSSION: There are two principal avenues by which a foreign animal disease could enter the United States: 1) importation of diseased animals or 2) importation of a foreign animal disease vector, such as an exotic tick, on nonregulated animals. The first avenue is unlikely because of quarantine restrictions applied to domestic livestock and wild ruminants upon entry in to the United States. However, the second avenue appears more likely, especially with zoological animals not subject to quarantine restrictions. The increasing volume and rapidity of commerce via air transport have intensified the danger of introduction and establishment of an exotic vector, particularly with the recent trend towards placing zoological animals in situations which directly expose them to susceptible domestic livestock and/or native wildlife. Two interceptions of exotic ticks on zoological animals emphasize this danger. In the first, the bont tick, Amblyomma hebraeum, an efficient vector of heartwater, was introduced into the United States in 1984 on black rhinoceroses imported from South Africa. Some of the tick-infested rhinoceroses were shipped to a working cattle ranch in south Texas. Fortunately, this tick did not become established. As a result of this incident, we now have regulations governing the importation of rhinoceroses as well as elephants, hippopotami, and tapirs. In the second, two other vectors of heartwater, A. lepidum, and A. gemma were introduced into the United States on ostriches imported from Zimbabwe on April 2, 1989. Like the black rhinoceroses, some of the ostriches were placed in ecological settings favorable for the establishment of an exotic tick. Premises with the ostriches are now under quarantine and the ostriches and premises are being systematically treated with an acaricide in order to eliminate the ticks.

SUMMARY: For over a quarter of a century, there have been numerous introductions of exotic ticks on animals imported into the United States. Some of these ticks have the potential of transmitting foreign animal disease agents such as heartwater, East Coast fever, and babesiosis. Even if they do not transmit disease agents, these ticks can be serious external parasites on our nation's domestic livestock and native wildlife. Consideration should be given to establishing regulations that prevent exotic ticks from being imported into the United States on any type of mammal, bird, or reptile.

Prepared by: D. D. Wilson, Senior Staff Entomologist, Cattle Diseases and Surveillance Staff, Veterinary Services.

Subject: Foreign Animal Diseases

Issue: Worldwide status

Discussion: The Office of International Epizootics (OIE) reported the following diseases during the months of January, February and March 1989.

Foot-and-mouth disease (FMD): In South America, Italy (74 outbreaks Jan/July), Turkey, Israel, Saudi Arabia, Bahrain, Hong Kong, Pakistan and Kuwait.

Vesicular stomatitis (VS): In Colombia.

Contagious bovine plural pneumonia (CBPP): In Kuwait.

Lumpy skin disease (LSD): In the Congo, Senegal and Zimbabwe.

Sheep and goat pox (S&GP): In Morocco, Turkey, Kuwait and Pakistan.

African horse sickness (AHS): In South Africa.

African swine fever (ASF): In Italy, Malawi, Namibia, Senegal and Spain.

Hog cholera (HC): In 9 countries, especially Mexico with 2,286 cases.

Velogenic viscerotropic Newcastle disease (VVND): In Botswana, Malaysia and Pakistan.

Viral hemorrhagic disease. (VHD) of rabbits: In China, Europe and Mexico.

In addition to the OIE reports, Animal and Plant Health Inspection Service (APHIS), International Services (IS) personnel maintain a constant watch on disease occurrences and report their findings regularly. This data is provided to the V.S. Emergency Programs staff and Import/Export staff and others for planning and decision making.

Summary: The outbreaks of HC and VHD in Mexico are a major threat to our swine and rabbit industries. We should maintain constant surveillance of disease occurrences and search for ways to reduce the prevalence through cooperative programs.

Constant outbreaks of disease such as FMD in Italy, indicate the constant threat of disease introduction through importations, especially animal products. We should continue to place priority on port inspection activities and foreign country surveillance to avoid a disease occurrence.

Prepared by: Dr. M. J. Gilsdorf, Senior Staff Epidemiologist
Operational Support, International Services

July 21, 1989

Subject: Necrotic Hepatitis of Rabbits

Issue: Foreign Animal Disease Present In Mexico

Discussion: Necrotic hepatitis of rabbits is a rapidly spreading highly fatal disease of domestic rabbits which was first described in China in 1984. In December 1988, the disease occurred in Mexico City, Mexico. By March 1989, the disease had spread to 595 premises in 10 Mexican states. The disease was introduced into Mexico via rabbit meat imported through the United States from China. The same or similar disease has been diagnosed in most European countries. The signs of disease are high fever, respiratory distress, and death within hours of the first clinical sign. Mortality may reach 90%.

The disease is caused by a small (25-30 nm) virus which no one has been able to isolate in cell culture. Researchers in various countries have attempted to identify the agent using virus obtained from tissues of infected rabbits. The virus has been tentatively classified as a picornavirus, calicivirus, and parvovirus. Regardless of the classification, a suspected diagnosis can be confirmed by using liver homogenate in a hemagglutination test.

Staff at the USDA, Foreign Animal Disease Diagnostic Laboratory (FADDL), believe the agent to be a parvovirus for they have shown: (1) the virus replicates in the nucleus; (2) hemagglutination inhibition and strong cross immunohistochemical labeling with porcine parvovirus and mouse and rat parvovirus monoclonal antibodies; (3) in situ hybridization with highly specific probes for porcine parvovirus and minute parvovirus of mice; and (4) protection by vaccination with a porcine parvovirus vaccine.

The Foreign Animal Disease Diagnostic Laboratory staff has also studied the pathogenesis of the infection. The wild cottontail becomes infected but does not die, and that feces from rabbits two weeks after recovery contain infectious virus. APHIS' staff at the Foot-and-Mouth Disease and Other Exotic Diseases Laboratory in Mexico City have shown that the virus does not kill the wild volcano hare.

Summary: Necrotic hepatitis of rabbits is a viral disease which can have a high morbidity and high mortality in domestic rabbits. If it were introduced into the United States, it could cause severe economic loss to the rabbit industry; but even more importantly, it could cause a severe disruption of research if it infected rabbit colonies in research institutions. This did occur in many medical research institutes in China.

Prepared by: Charles A. Mebus, Laboratory Chief, FADDL

ACTION PLAN

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR THE DESTRUCTION OF SEIZED AND CONDEMNED AGRICULTURAL COMMODITIES TO PREVENT THE TRANSMISSION OF ECONOMICALLY SIGNIFICANT AGRICULTURAL PESTS AND DISEASES.

PROPOSED ACTION

The purpose of this EIS is to identify all of the currently available techniques for the destruction of condemned agricultural commodities, and to identify the environmental risks and hazards associated with their use. The goal of the EIS is to ensure that if condemnation and destruction is selected as the treatment of choice for a particular pest or disease outbreak, that the destruction technique selected is conducted in an environmentally sound manner. The alternatives considered herein are the alternative destruction techniques currently available for use in the treatment of condemned agricultural commodities, including: burial, open-pit burning, contained burning, high-temperature rendering, freezing, and chemical decontamination.

BACKGROUND

The Animal and Plant Health Inspection Service (APHIS) is responsible for, among other things, the protection of american agriculture from outbreaks of economically significant agricultural pests and diseases. This responsibility is met in several manners, including surveillance monitoring of commodities proposed for importation at domestic ports of entry, testing of animals and plants for pests and disease, and ongoing surveillance of domestic commodities, including cultivated crops and farm animals, for the presence of certain pests and diseases of significance.

APHIS' statutory authority for such actions provides, among other things, for the condemnation and destruction of diseased or contaminated agricultural commodities if there is a risk of transmission of such disease or pest from those commodities. In the past, APHIS has been involved in several major programs involving the condemnation and destruction of large quantities of agricultural commodities, including: the Avian Flu epidemic in the Delmarva peninsula in 1984, where several million chickens and turkeys were condemned and destroyed; the exotic newcastle outbreak of 1971, in California, where several million birds were condemned and destroyed; the ongoing citrus canker infestation in Florida, where several hundred acres of orange groves have been condemned and destroyed; and the routine condemnation and destruction of stored agricultural commodities at ports of entry upon the discovery of exotic pests like the Khapra Beetle. Other, more minor actions, include the depopulation of herds of cattle upon the discovery of bovine tuberculosis or similar diseases.

Not all diseased or pest contaminated commodities are condemned and destroyed. Many economically significant pests and diseases may be satisfactorily treated using available pesticides, vaccines, biologicals, or the like. This EIS presupposes that none of these alternative treatments are available, and that destruction of condemned commodities is the only treatment available. Implicit in this supposition, however, is the understanding that prior to any decision to condemn and destroy a commodity, alternative treatments available for the respective pest or disease will have been evaluated.

Because of the differences in disease and pest epidemiology, diagnosis, and treatment, the evaluation of specific disease or pest treatment is not included in this EIS. Rather, specific diseases or pests will be used for illustrative purposes to show the types of activities contemplated by APHIS. The techniques available for destruction of agricultural commodities do lend themselves to evaluation in an EIS, however, as open pit burning of either a diseased animal carcass or a diseased citrus tree raises similar environmental concerns.

RECOMMENDATION

Biotechnology, Biologics and Environmental Protection recommends the adoption of the following action plan for the development of the programmatic EIS.

ACTION PLAN:

Initial three months:

APHIS Scoping Process:

- Clarify all authority and responsibility, both Federal and state
- Identify the range of potential condemnation and disposal activities
- Develop outline of alternative disposal methods available
- Identify basic elements of environmental concerns and potential effects, including air, surface and groundwater, and risks of pest and disease transmission from disposal technique.

Fourth and fifth month:

- Public Scoping Meetings to solicit comments on the scope of the EIS

Sixth through twelfth months:

- Develop Draft EIS on disposal techniques

Thirteenth and fourteenth months:

- Public Availability of DEIS

Fifteenth through nineteenth months:

- Revision of DEIS pursuant to public comments, preparation of FEIS

Twentieth month:

- Publication of FEIS

RESEARCH PLAN FOR PLUM ISLAND

Abstract

The mission of the Plum Island Animal Disease Center (PIADC) is to protect US animal industries and our exports from economic losses caused by foreign animal diseases.

Current vaccines for foot-and-mouth disease (FMD), the most important disease threat, are of the chemically-inactivated, whole virus type. Such vaccines cannot by law be made in the US. In the event of an outbreak, many months would pass before vaccine supplies could be purchased and the more than 175 million US cattle, sheep and swine could be vaccinated. It would be difficult, perhaps impossible, for the US to obtain needed vaccine quickly from manufacturing plants in South America, Africa, the Middle East or the Soviet Union.

The immediate goal of PIADC research is to produce foreign animal disease vaccines that can be made legally in the US, by a US manufacturer, for use in the US by APHIS in an emergency and for sale abroad.

By the time any such vaccines were used in the US, animal commodity producers would already have incurred losses in the hundreds of millions, perhaps billions, of dollars. New strategies are needed to control foreign animal disease epidemics and we plan to research antiviral drugs that would prevent the need for wholesale slaughter of in-contact animals and reduce producer losses.

Finally, genetic engineering technology may allow us to create disease resistant animals that would not be susceptible to infection by FMD, African swine fever virus, etc. United States breeders have access to the technology that would allow us to export stock with these characteristics all over the world, making a profit, and creating new export markets in the absence of disease at home.

Each foreign animal disease threat is being examined in detail to determine the most productive use of PIADC resources for its control. Resources are being concentrated on FMD and African swine fever with smaller projects in other areas where quick, significant impacts are likely.

The new programs demand recruitment of new, highly-creative scientific staff. A small cadre of permanent Federal scientists will be supported by large numbers of temporary researchers - postdoctoral fellows, visiting scientists, and graduate students. A recruiting program is being targeted at young, well-trained scientists who want to build a career by 5 years intensive research at PIADC and local university collaborators.

RESEARCH PLAN FOR PLUM ISLAND

Basic Premises in Foreign Animal Disease Research

Research objectives at the Plum Island Animal Disease Center (PIADC) cannot be determined without an overall framework of program goals, an understanding of who will use the technology developed, and an appreciation of what is realistically achievable within the resources of the Agricultural Research Service (ARS). We are not short of opinions and suggestions on individual research topics from a farrago of sources, but few people have a comprehensive understanding of how to put together a successful, productive long-term research strategy for PIADC.

Probably more significant than my exact program goals is the process by which they were formulated, as described below.

The mission of PIADC is to protect United States animal industries and our exports from economic losses caused by foreign animal diseases. It is the role of the United States Agency for International Development (US-AID) to support research on foreign animal diseases to benefit foreign agricultural industries and third world countries. Part of PIADC's mission is to provide technology to allow safe import of products essential to United States agricultural/biomedical industries - such as cell lines, embryos, monoclonal antibodies, but it is not our role voluntarily to facilitate the import of foreign agricultural produce competing with United States domestic producers - such as Serrano/Parma hams.

Until very recently, the only technologies which PIADC could research to protect United States agriculture against foreign animal diseases were the development of safe effective vaccines and improved methods of disinfection/decontamination to prevent accidental introduction of these agents in imported produce. Since 1953, PIADC has made original discoveries that improved vaccine technology and set standards of hygiene for exotic disease agents. At the beginning of the 1980's, PIADC scientists, in collaboration with Genentech Inc., made a major research advance in showing that immunogenic proteins from foot-and-mouth disease (FMD) virus could be produced by recombinant DNA methodology - a discovery that changed the course of FMD research. In the last two years, PIADC scientists in collaboration with University and US Army scientists have developed vaccines for Rinderpest and Rift Valley fever in ruminants.

There are singular features of foreign animal disease vaccines that make our mission difficult. Most vaccines, except rDNA-derived, consist of the whole virus, either alive or killed with chemicals. In the case of exotic animal disease agents, this poses the following problems:

1. United States law forbids whole exotic animal disease agents on the US mainland - so there are no US domestic manufacturers of exotic animal vaccines, since these agents cannot be held or grown in bulk, even for production of inactivated vaccine.
2. APHIS' policy on disease control is to eradicate by slaughter all animals infected with foreign diseases and all animals in contact. Vaccination is

forbidden because protected animals might hinder the early diagnosis or eradication of disease.

3. If animals were vaccinated with whole virus vaccines, they would respond immunologically as if exposed to the virulent disease agent - so vaccinated animals and their products could not be exported to many countries free of exotic diseases.
4. The only United States facility where exotic disease vaccines could be prepared in an emergency (with an emergency law change) is the United States Army plant at Swiftwater, Pennsylvania, operated under contract by Salk Institute/Connaught Labs. This plant could not make foot-and-mouth disease (FMD) vaccine and would probably be restricted to zoonotic agents.
5. APHIS holds vaccination as a last resort, but could be forced into it under certain circumstances. In a widespread United States epidemic of FMD, the economic consequences would be staggering (billions of dollars lost) the logistics of emergency FMD vaccination are not well appreciated.

FMD virus occurs in seven serotypes: A, C, O, SAT1, SAT2, SAT3 and Asia. There are about 69 strains of the virus within all these serotypes and the virus mutates very rapidly so that new strains are selected constantly, particularly in areas where the disease is rife and cattle are vaccinated - this selects for a new virus type that can evade immunity. There is some cross protection between different strains of each serotype - A₁ will protect somewhat against A₇ - but not between serotypes - A₁ will not protect against any O, C or other serotype. Not all of the 69 strains are extant in the world at any one time, so it is not essential to have 69 vaccines. Commercial companies market vaccines for about 14 different strains at any one time (combinations of strains differ with various geographic areas of the world depending on what strains are prevalent in the area).

The United States is susceptible to the accidental or deliberate introduction of any of the 69 strains.

If there were an outbreak of FMD in the United States tomorrow, and APHIS immediately decided to order vaccine from abroad, it would take 30 days before the United States virus could be adapted to continuous commercial cell culture and another 90 days before the first vaccine could be prepared and safety tested. Existing FMD vaccines are whole virus chemically inactivated - faulty inactivation is frequent and results in vaccine-induced FMD. After 90 days, about 1 million doses/vaccine/day could be manufactured (worldwide FMD vaccine production now is about 300 million doses/year).

In the United States as of December 1987, there were 100 million cattle, 56 million swine and 10 million sheep. From day 1 of an outbreak to the day the last of these could be given one dose of vaccine would be 30 + 90 + 166 - i.e., 286 days. Were this to come to pass, days 286 and thereafter would probably see the departure from office of those responsible for protecting United States agriculture from foreign animal diseases.

The United States, Canada and Mexico maintain an FMD antigen bank at PIADC. This contains 2 million doses of each of 5 different strains. There are about 14 million cattle and 2 million sheep in Texas, the state with the highest ruminant population. To have a strategic reserve of vaccine to protect Texas alone would involve 14 million animals and 14 different FMD vaccine strains at a cost of about 40 cents a dose (purchase, safety testing, storage at PIADC over 5 years) - about \$78 million. We do not have enough vaccine in the Bank to protect very much. In an emergency, we would have to purchase vaccine abroad from manufacturers in Brazil, Argentina, Uruguay, Paraguay, South Africa, Botswana, Iran, Iraq and the Soviet Union. There are three manufacturers in Europe - in London, Lyon and Cologne. But the European community plans to halt FMD vaccination in 1992 and these plants will probably be closed. None has the excess capacity to help the United States in an emergency, this could only be done from the other countries in South America, Africa, the Middle East and Eastern Bloc.

With all these factors in mind, the overall vaccine goal of PIADC is to produce foreign animal disease vaccines that can be made legally in the United States by a United States manufacturer, for use in the United States by APHIS in an emergency and for sale abroad. Under current law, such vaccines cannot be whole virus and, consequently, we are focussing on rDNA methodology in which only part of the virus (a subunit) is found in the vaccine and for which new diagnostic techniques can be developed that will differentiate between antibodies in vaccinated animals and those in animals that have recovered from infection with the virulent organism. Current subunit vaccine technologies involve: (1) deletion of one or more specific viral genes and insertion of marker genes (as in pseudorabies vaccines); or (2) expression of immunogenic viral genes in *E. coli*, yeast, vaccinia, herpes, baculovirus or other vectors. These technologies are being applied by several U. S. vaccine manufacturers for commercial products. The Rinderpest vaccine recently developed by PIADC and the University of California is a vaccinia-vectored vaccine that meets all these criteria.

Currently, APHIS only has two effective strategies in the battle against foreign animal diseases: (1) to kill and burn (or bury) all infected animals and those in contact (a technology over 100 years old); and (2) to spray insecticides by air over insect habitats (a technology about 50 years old). Unfortunately, it is now 1988. There has not been an FMD outbreak in the United States since 1929, and US animal agriculture has changed. There is extensive interstate transport of cattle through numerous marketing and sorting centers. There are a few very large feedlots producing the majority of the nation's meat. The public would not stand by to watch massive slaughter and burning of major feedlot populations nor are they willing to tolerate aerial spraying of insecticides over millions of acres.

New strategies are urgently needed because it is a question of when, not if, there will be a serious exotic disease outbreak in the United States. Thus far, the power of rDNA and biotechnology has really only been used to try to answer the question posed by Louis Pasteur in the 1870's. There is nothing wrong with this, but there are far greater opportunities for the United States in other approaches.

PIADC Research Program

The United States Animal Health Association (USAHA) regularly publishes a manual "Foreign Animal Diseases: their prevention, diagnosis and control," (USAHA, Richmond, VA, 1984). This describes over 36 foreign animal disease agents. Not all of these are highly threatening to the United States. Nor can we hope to have the research resources to study them all - either in personnel or in funding. I would classify these agents as follows:

Group 1. Very important agents demanding highly creative PIADC research:

Foot-and-mouth disease	(virus)
African swine fever (ASF)	(virus)
Hog cholera (HC)	(virus)
African horsesickness (AH)	(virus)
African heartwater (AHW)	(Rickettsia)
Bluetongue (BT)	(virus)

In the FY-89 ARMPs, the "State of the Location" spelled out the research strategy for PIADC. I believe we are planning to cover all the most important diseases. Recombinant DNA vaccines for the diseases in Group 1 are not likely in the next 5 years. We plan the world's best programs in FMD and ASF as immediate priorities. We need to look closely at what is being done in European labs to develop an rDNA vaccine for HC and to create a PIADC HC program only in an area that will be productive. We plan programs in AHS as soon as we establish the FMD, ASF and HC groups. There are much stronger US research groups than ARS in AHW - the University of Florida (UF) and Washington State University (WSU): the latter works very closely with the ARS Hemoparasite Lab at Pullman on Anaplasmosis and Babesiosis, disease agents very similar to AHW. PIADC does not have the molecular scientists to attack AHW - they are all at UF or WSU. These groups are much better funded than PIADC's AHW program (their total annual direct research budgets on hemoparasites exceed that of the entire PIADC direct research budget for all diseases) - from ARS, BARD, CSRS, US-AID, private industry, state resources, etc. Bluetongue is a problem in the United States and the ARS lab at Laramie is charged to research its control. Until there are methods to control domestic US bluetongue strains, it is premature to try to control exotic strains.

Group 2. Important diseases where known new technology might produce effective rDNA vaccines quickly:

Contagious agalactia of sheep and goats	(Mycoplasma)
Contagious bovine pleuropneumonia	(Mycoplasma)
Contagious caprine pleuropneumonia	(Mycoplasma)
Pest of Small Ruminants	(virus)
Rinderpest	(virus)
Sheep and goat pox	(virus)
Rift Valley fever	(virus)
Venezuelan Equine Encephalomyelitis	(virus)
Japanese Encephalitis	(virus)
Nairobi sheep disease	(virus)

As an important but subsidiary program, we will take to the technology transfer stage research that would enable licensing for US production of vaccines for a number of foreign animal disease agents. Within the next 5 years we can hope for vaccines to Rinderpest and Pest of Small Ruminants (existing collaboration with University of California), Rift Valley fever and Venezuelan Equine Encephalomyelitis (collaboration with USAMRIID, Fort Detrick): in all four instances, vaccines can be developed without fundamental basic research by ARS. Shortly, thereafter, with advances in Mycoplasma vaccine technology, we could produce better vaccines for contagious agalactia and contagious bovine and caprine pleuropneumonia, without massive PIADC investment. Also, with USAMRIID assistance, for Japanese Encephalitis. The practical development of real licensed US vaccines is essential if we are to retain United States animal industry support for the high risk and very difficult research needed in FMD and ASF.

Group 3. Important diseases which are being well researched by other countries/institutions:

- African trypanosomiasis
- Akabane
- Avian influenza¹
- Babesiosis
- Bovine Ephemeral fever
- Bovine spongiform encephalopathy (BSE)
- Contagious equine metritis
- East Coast fever
- Louping-ill
- Malignant catarrhal fever
- Swine vesicular disease
- Velogenic viscerotropic Newcastle disease²

Except for BSE, we plan no research on these at PIADC because there are better groups elsewhere than we could assemble here. An ARS Advisory Group on BSE chaired by Alex Thiermann (now by R. Breeze) has been monitoring the disease situation in Britain for 18 months. The Group has recommended that an experiment be done at PIADC to determine if the BSE agent causes disease in mink and if it might be the same agent as Transmissible Mink Encephalopathy, which occurs in the US. This experiment will be done in FY-90 at PIADC in conjunction with British experts and specialists from ARS, University of Wisconsin and the Public Health Service. ARS will continue to monitor the British BSE situation.

Group 4. Foreign animal diseases of lesser importance:

- Dourine
- Epizootic lymphagitis
- Glanders

¹. Included in mission of ARS Poultry Lab in Athens, GA

². IBID

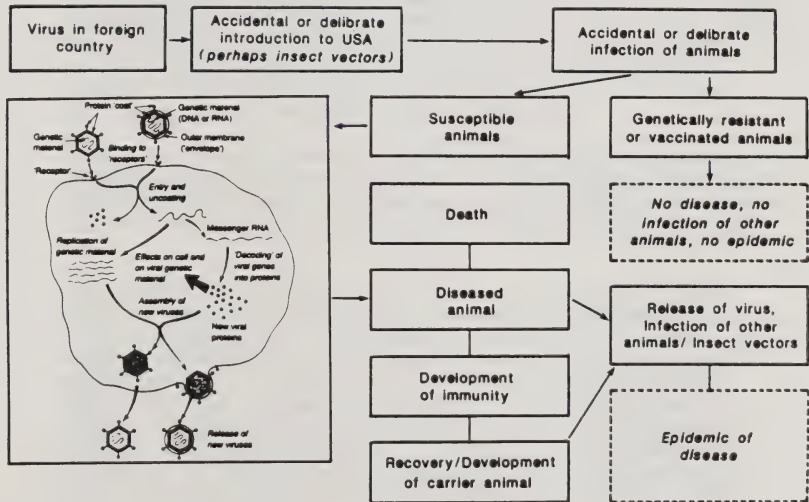
Hemorrhagic septicemia
Lumpy skin disease
Parafilaria in cattle
Screwworm myiasis
Vesicular exanthema
Vesicular stomatitis

We plan no research on these at PIADC at present. For the most part, large research programs would be needed to discover much fundamental knowledge to develop a hypothesis for control of the agent. APHIS plans to develop a better diagnostic agent for Glanders and this will involve a small project at PIADC in APHIS facilities.

Developing the Research Program

Foot-and-Mouth Disease

To determine what needs to be done in FMD research, I developed a diagram of the pathogenesis of a foreign animal disease agent causing a US epidemic (Figure 1).



I then looked at each step in the pathogenesis and asked what ARS research could be done that might control the disease at that step. By "control," I mean the halting of (further) economic loss as a result of the disease.

There is very little ARS research that could help control steps before the virus accidentally or deliberately infects US cattle - these steps are controlled by APHIS regulations, disinfectants and insecticides. Steps where intervention is possible include:

1. Genetically Resistant Animals

- a) Some species are insusceptible to FMD infection, probably because the virus cannot attach to cell receptors. X-ray crystallography is essential to identifying the nature of the virus - receptor attachment.

If we understood the chemical basis of species insusceptibility, it might be possible to create insusceptible cattle and swine.

- b) Recombinant DNA techniques using antisense RNA which binds selectively to defined sequences of viral RNA have been found to inhibit replication of a number of animal viruses in vitro. Another technique of "gene shearing" uses specific RNA sequences to slice other RNA molecules, causing them to lose their function - effectively preventing the production of protein from messenger RNA, including the RNA message of viruses. Since we know a great deal about the intracellular assembly of FMD virions, it is possible that genetically-engineered transgenic animals bearing antisense or gene-shear RNA could be produced.

The International Laboratory for Research on Animal Diseases (ILRAD) in Kenya has spent 12 years and over \$140 million in the search for a vaccine for trypanosomiasis in cattle. This search has now been downgraded in favor of research on disease resistant cattle.

In West Africa, there is a local breed of cow called N'Dama, which is naturally tolerant (no adverse clinical/production signs) to infection by trypanosomes, hemoparasites, ticks, streptothricosis and perhaps other diseases. An international consortium based around the International Trypanotolerance Center (ITC) in the Gambia is conducting fundamental genetic studies, including mapping the bovine genome, to define the basis for resistance in N'Dama. I have close relations with scientists at ILRAD and ITC and possible collaborations with PIADC were discussed recently at a meeting in the World Bank. Disease resistant animals used to be science fiction, but they are now a possibility.

2. Vaccinated Animals

Existing FMD vaccines have many limitations other than legal restrictions on US manufacture. A great deal of pioneering research has been done on subunit FMD vaccines. In summary:

- a) VP1 is the main immunogenic protein of FMD. VP1 expressed in E. coli partially protects cattle against FMD, but it is proving difficult to present expressed VP1 in a conformationally authentic fashion to the immune system. We are exploring other expression systems including vaccinia virus and baculovirus.

It looks like a successful subunit vaccine must express more of the FMD virus surface than VP1 alone for conformational authenticity and we are examining ways to do this. X-ray crystallography will help demonstrate 3-dimensional structures of expressed FMD immunogens.

- b) Anti-idiotypic FMD vaccines have some potential - Dr. Baxt is researching these. X-ray crystallography of virus antibodies and cell receptors would be valuable in this.
- c) Synthetic peptide vaccines representing immunogenic epitopes of VP1 have potential as FMD vaccines. A lot of work remains to be done - there is no simple answer. X-ray crystallography would be invaluable in examining 3-dimensional structures of linear amino acid sequences and of immunological determinants necessary for effective vaccination.
- d) FMD virus is very dangerous because new populations of virus constantly evolve which can evade host antibodies because of minor changes in configuration of surface epitopes.

X-ray crystallography is essential to understand:

- The structural differences between FMD serotypes - what differences prevent cross-protection between the seven serotypes?
- How does the virus react with specific antibody, including monoclonals?
- What is the structural basis for molecular variation involved in escape of a mutant virus in the presence of specific neutralizing antibody?
- Why does vaccination fail when antibody levels seem to be high enough to protect - what is the structure of the virus that grows through the immune response?

3. Susceptible Animals

- a) Chemical compounds have been found that prevent un-coating of picornaviruses once the virus has entered a susceptible cell. These

compounds bind to a pocket in the virus' protein coat, X-ray crystallographic studies show. The virus is not killed, but it cannot replicate within the animal cells to cause injury. We are doing preliminary tests on antiviral compounds for FMD with the company involved in this research. It is possible that with X-ray crystallography data specifically for FMD serotypes (rather than predicted data from other models) an effective anti-FMD drug could be designed.

Such a drug would be enormously valuable to APHIS. Instead of slaughtering in-contact, clinically normal cattle in FMD outbreaks, they could be treated with a drug to halt any infection. This drug could be given in a ring around a disease outbreak. Treated cattle could be scheduled for slaughter for food rather than burned (this may not happen in the United States, but would be valuable in the third world) or they could be left on the farm indefinitely.

- b) An effective anti-FMD drug that would halt an outbreak would be the single greatest advance ever achieved in United States control strategies for exotic diseases. By the time the United States had protected its cattle with even the most sophisticated rDNA vaccine, billions of dollars would already have been lost. An antiviral drug could prevent these huge losses.

Pinpointing the chinks in the virus's armour

THE MYSTERIES of the molecular biology of the virus are yielding new targets for antiviral drugs. Jim Neil of the Beatson Institute in Glasgow, speaking last week at the Medical Research Council in London, reviewed the possible approaches.

The very complexity of the genetic structure of the human immunodeficiency virus and its life cycle could make it vulnerable to interference by drugs. One promising example, Neil said, is a variety of compounds that inhibit the uncoating of viruses within the host cell. Michael Rossmann at Purdue University in Indiana, he said, had identified compounds that inhibit the uncoating of picornaviruses (which cause diseases of the respiratory and gastrointestinal tracts, as well as polio).

These compounds act by fitting into a cleft in the core shell of picornaviruses. These viruses do not have a fatty envelope layer as HIV does, but the compounds are soluble in lipids, so the lipid membrane of HIV should not prove too great an obstacle.

Rossmann is now studying the core proteins of HIV to determine its structure. The next stage of the research would be to design compounds that fit in a cleft of this protein.

Another approach that has come to the fore in recent months is to interfere with the action of the protein products of HIV's regulatory genes. These genes are called *tat*,

rev and *nef*. The products of the *tat* and *rev* genes seem to be essential if the virus is to make any of its other proteins. The proteins made by the *nef* gene downregulate the production of the virus's structural proteins, without which viral replication is impossible.

Any of these proteins could be useful targets for antiviral drugs. The first step is to work out their function more precisely. Researchers at the Medical Research Council's Laboratory of Molecular Biology in Cambridge are producing the *tat* gene product in bacterial cells using genetic engineering. Other researchers at Oxford are also trying to produce biologically active proteins from this gene. They have injected the protein into the nuclei of loads of eggs and, says Neil, it appears to be active.

Once scientists have available the purified proteins manufactured by these three genes, they can study the functions of these molecules by blocking parts of the proteins with monoclonal antibodies (These are purified antibodies that recognise a single antigenic site.) Researchers will also be able to study the effect of the proteins on cells.

Eventually, the aim would be to inhibit some of these proteins, perhaps with short synthetic segments of protein that resemble the protein's active site. An alternative might be a short sequence of genetic building blocks which would bind irreversibly to

the virus's genetic material, preventing manufacture of the protein.

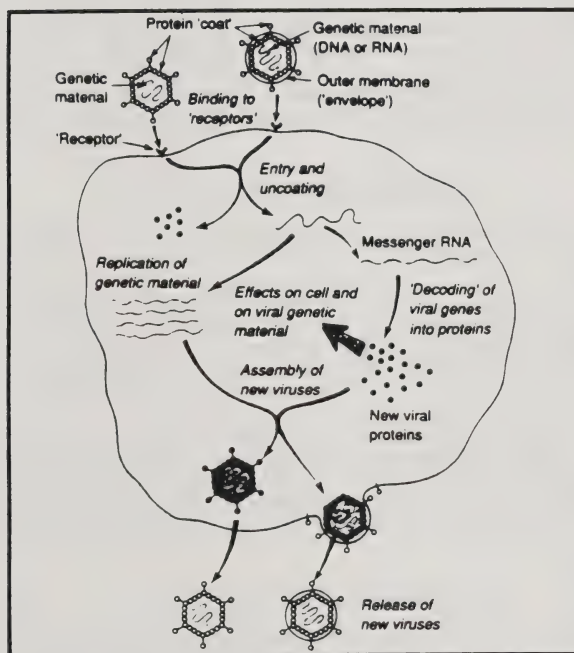
Another vulnerable point in the life cycle of the virus might prove to be during the assembly of viral particles. Neil said that Raymond Dwek of the University of Oxford has identified substances that could inhibit enzymes known as glycosidases. These have the task of adding sugar molecules to the proteins of the virus, an essential step in the manufacture of infectious viral particles.

One further strategy that researchers funded by the directed programme are working on is to interfere with the maturation of the new viral particles in the cell. Viral enzymes called proteases play a vital role in cleaving large precursor proteins into smaller molecules which form the mature virus. The fact that a viral enzyme carries out this step, rather than one supplied by the host cell, suggests that human cells have so closely related enzymes. So it might be feasible for researchers to inhibit this enzyme specifically without adverse effects on the cell's enzymes.

Neil said that three groups are now working on understanding the structure of the protease. They would try to develop analogues for the enzyme's substrate that would prevent the enzyme from splitting the precursor proteins. □

The search for antiviral drugs has historically not been very successful - largely because not enough basic information was available on the early stages of intracellular virus assembly. But there have been successes - for cold viruses (mentioned in 3a) above) and herpesviruses (acyclovir). Now there is a tremendous effort on antiviral compounds for Human Immunodeficiency Virus (HIV) because it appears that a vaccine is not likely very soon.

I strongly believe that the intense effort in HIV will create major new advances in concepts of antiviral drugs and that X-ray crystallography and molecular drug design will be very powerful tools. We know a great deal about intracellular events in FMD virus replication (Figure 2) and it is not an unreachable goal to envisage a designed antiviral drug inhibiting a specific step in viral pathogenesis. As Dr. Grubman's work proceeds, such a step may become obvious.



4. Diseased Animals

We need to know much more about the carrier state of FMD in chronically-infected animals. Where is the virus? How is it evading the immune response? What causes it to be shed to infect others? Are there antivirals that can remove virus from carriers?

5. Infection of Other Animals

We need to know more about the molecular pathogenesis of FMD infection by the respiratory route - how is it gaining entry to the body and can this be specifically inhibited?

Hog Cholera/African Swine Fever Research Program

The goals are: (1) a vaccine; and (2) transgenic disease resistant swine. These goals are both extraordinarily difficult.

An enormous amount of molecular virology, pathology and immunology needs to be done on ASF so that we can use Figure 1 to formulate new hypotheses for control. Three MUs - Microbiology, Immunobiology and Molecular Pathology will play critical roles. Microbiology will unravel intracellular viral events (how the virus sees the pig); Immunobiology will describe how the pig sees the virus; and Molecular Pathology will unravel the biochemical basis of the immunoinflammatory events that follow mutual sighting of virus and pig by each other.

African Horsesickness Program

African horsesickness virus is very similar to bluetongue virus. Dr. Grubman has great experience in molecular virology of bluetongue.

Once I have recruited the people for FMD, ASF and HC, I will look at their talents and see if I can put together a team (probably fortified by specifically recruited postdocs) to attack AHS as a secondary interest to their other work. I do not see that we will have the funds for a stand-alone program - and there will very likely not be the need.

Bluetongue rDNA vaccines have not been very successful - it was not as simple as everyone thought. Much more work needs to be done on 3-dimensional structures of bluetongue epitopes. African horsesickness will likely be the same, and we envisage X-ray crystallography playing a major role in the development of a successful rDNA vaccine, which is the goal of this program.

Program on Group 2 Vaccines

No new permanent scientists will be recruited specifically to pursue these projects, which will be largely funded by USAMRIID/US-AID and others. We will probably recruit some postdocs and sabbatical visitors and will use

existing scientists as they have interests to direct activities. Most PIADC scientists enjoy working on one major and one minor viral system to keep them refreshed.

Recruiting Strategy

The Research Program outlined above is exciting and meets the needs of APHIS and US animal industries.

An exciting scientific challenge is the key element in my recruiting strategy. We want to do research at PIADC that cannot be done at a US university because of lack of sustained financial commitment over a period of years, or for lack of major equipment/facilities.

Transgenic virus resistant animals are a big goal. No one is doing X-ray crystallography of animal viral pathogens except Fred Brown and the Oxford Group. We want to do rDNA vaccine research at the cutting edge.

The targets of my recruiting strategy are:

- 1) Established assistant/associate professors who have experience, a good track record in extramurally funded infectious disease research, and a strong interest in food animal diseases.

Such people will accept some negatives, including salary, about PIADC if their research programs here allow them to tackle big questions of science with an operations budget, equipment, laboratory facilities and research team which is much larger than they could get in any university for food animal infectious disease research (even extramurally well funded) and which is sustained over several years.

I have had calls from exactly such people after our advert in Science - CSRS Special Research and Competitive Research Grant Programs in Animal Diseases/Molecular Biology are perceived as so unpredictable, unfair and illogical that many productive people are despairing of the whole area.

- 2) Postdocs - recent DVM/PhD or PhD graduates in related sciences. We want PIADC to be the place to go in animal disease research in the five years post-PhD. We want to have the program, leadership, laboratories, operations, equipment and animal facilities that will enable the postdocs to build a very powerful CV - and then to compete for an Associate Professor position in a university or a career research position elsewhere. To encourage this, we would hope postdocs would teach a modest number of classes at SUNY (Stony Brook), University of Connecticut (Storrs) or Yale so that teaching experience could be acquired - important for an academic career.
- 3) Sabbatical researchers here for 12 months - half at ARS expense.

I plan to have 10-12 "Principal Investigators" - career ARS research leaders and scientists - each of whom will be supported by as many postdocs

and sabbatical researchers as the budget allows. A principal investigator would have one or two technicians to keep the laboratory together. The Center would have a few category 3 support scientists to run specialized machinery - X-ray crystallography, fluorescence activated cell sorter and electronmicroscopes. We will encourage PhD students in collaboration with SUNY, Yale and University of Connecticut - and anywhere else with a shared interest.

We will never have a large cadre of technicians because there aren't many in the area and we cannot pay enough to bring them from outside. So we will have to do without - except for the minimum we must have and can probably get through training and retraining of present employees and local recruitment, including Connecticut. We can get postdocs/sabbaticals from the United States and overseas. We can get 10 good "Principal Investigators."

SUBJECT: Salmonella enteritidis (SE) Phage-Type 4

ISSUE: A strain of SE identified as phage-type 4 has been found to be highly pathogenic in poultry. This strain has caused significant losses in many European poultry operations. The disease in poultry causes increased mortality in chicks, stunting, and poor feed conversion in maturing poultry, culling losses at slaughter due to perihepatitis or pericarditis in apparently normal birds. Evidence exists for transovarian passage of this strain of SE to progeny and to eggs. Production losses in infected flocks cause severe economic impact to the affected operation.

SE phage-type 4 also causes severe gastroenteritis in people. This strain of SE has become the most common agent in food poisoning outbreaks in the United Kingdom (UK) since 1980. The majority of outbreaks are associated with chicken meat or eggs. The number of culture-confirmed cases of SE in the UK rose from 1500 in 1981, to over 7000 in 1987, with a continued upward trend in the first half of 1988. The increase in human cases is attributable entirely to SE phage-type 4. It is estimated that one case of SE in 100 is reported. There were, according to this estimate, approximately 700,000 cases of human SE in the UK in 1987. The questionable food safety of poultry and eggs in the UK precipitated a crisis of confidence which has seriously damaged the marketability of these products.

DISCUSSION: It is in the interest of the United States poultry industry to prevent the introduction of this strain of SE phage-type 4 into the United States. In an effort to prevent this from occurring, regulations restricting the importation of table eggs from countries where SE phage-type 4 is considered to exist, have been published in the Federal Register. These regulations require testing of the flock of origin for SE Quality Assurance prior to shipment of eggs from any country except Canada, which has been demonstrated to be free of SE phage-type 4. Similar regulations are in the process of being published for hatching eggs and live poultry. Priority for phage-typing of isolates has been established to identify those isolates most likely to be associated with disease. They are as follows: 1. Clinically ill birds, 2. Isolates from imported poultry, 3. Isolates from Breeder Flocks, and 4. Isolates from flocks associated with human outbreaks of SE. Veterinary Services has had some difficulty obtaining the phage stock from the laboratory of origin in order to implement testing.

SUMMARY: It is in the interest of the United States' poultry industry to prevent the introduction of SE phage-type 4 into the United States. To prevent this from occurring, regulations restricting the importation of table eggs from countries where SE phage-type 4 is considered to exist, have been published in the Federal Register.

Not all isolates of SE phage-type 4 are of equal pathogenicity. The only isolate of SE phage-type 4 found in this country was a variant found in a mouse which displayed low pathogenicity when inoculated in poultry. Any isolates of SE phage-type 4 should be evaluated for pathogenicity and fingerprinted with plasmid analysis and restriction endonuclease mapping to distinguish low pathogenicity strains from the strain found in the UK.

Prepared by: S. F. Altekruse, Staff Veterinarian, Emergency Programs,
Veterinary Services.

Subject: Screwworm Eradication in North Africa

Issue: Collaboration with the Food and Agricultural Organization (FAO) in its effort to eliminate screwworms (SW) from North Africa.

Discussion: The new world SW, *Cochliomyia hominivorax*, was recently identified in North Africa (Libya) with several thousand cases reported to date. The Food and Agricultural Organization (FAO) of the United Nations is developing a program to combat the parasite. The program is to include information/education campaign, epidemiological studies, and eventually eradication. At a June 1989 meeting in Rome, Italy, FAO requested the support of the Mexico-U.S. SW Commission. Proposed collaboration includes visit of four technicians from North Africa (two Libyans) to the production facility in Tuxtla Gutierrez, Mexico, on August 8, shipment of training materials, information and drawings on aircraft modifications required to disperse sterile flies, and the sale of sterile SW to FAO for dispersion in North Africa.

Concerning the sale of sterile SW, FAO has proposed that the Commission send 10,000 sterile SW pupae to Vienna and 100,000 to Libya to study transportation effects. Assuming that method of shipment is satisfactory, the Commission would then send four million flies per week for three months to Libya, charging \$U.S. 2,000 per million to cover production cost.

The FAO needs support for their program for they lack the expertise, the technical and informational materials, and the sterile flies needed for eradication. They also need support in the design and elaboration of training programs. The present sole source for the above needed support is the Joint Mexico-U.S. SW Commission which is financed 80% by the United States and 20% by Mexico. The Commission maintains the only operating new world SW production facility in the world. The facility has the capacity to produce 500 million sterile flies per week while it is presently producing only half that number for use in Mexico and Guatemala. Production costs average \$U.S. 1,700-1,800 per million flies depending upon worker productivity at time of production. The Commission gained expertise in international shipments of sterile SW from southern Mexico during the 1987 SW incidents in the United States.

The Department of the Treasury is the sole authority able to grant exceptions to the restrictions on direct or indirect aid to Libya. A U.S. State Department document recommending such an exception, i.e. screwworm collaboration through FAO, is awaiting signatures at the State Department. Upon signature, the document will be sent to Treasury. The document specifically mentions technology exchange; reception of specimens from Libya, and sterile screwworm transfer. Upon receipt, the document will be submitted to USDA/OGC for their review and opinion.

Summary: The FAO needs assistance in its eradication of SW from North Africa. The only source for that assistance is the United States supported SW Commission in Mexico. Production of the needed flies is technically feasible and the price offered by FAO covers production costs. The Joint Mexico-U.S. SW Commission should be authorized to collaborate with FAO in its SW eradication in North Africa.

Prepared by: Dr. A. B. Thiermann, Deputy Administrator
International Services

SUBJECT: Swine Semen From China

ISSUE: Certain pork producers, primarily in Iowa and Illinois, have opposed the importation of swine semen by the Dekalb Company from the People's Republic of China (PRC).

DISCUSSION: Objections primarily were presented in written comments to a proposed rule, which outlined specific test and quarantine requirements for the donor swine and semen and at a public hearing called for by the Animal and Plant Health Inspection Service (APHIS) in Cedar Rapids, Iowa. The principal objections voiced were that the procedures used were less costly and took less than those for live Chinese swine imports. Another general comment was that the procedures used made the swine semen more of a disease risk than the live swine and that the comment period of 15 days appeared to be an attempt to limit public comment. APHIS extended the end of the comment period from April 12, 1989 to June 12, 1989. The final rule was published July 11, 1989. APHIS' response was that our import regulations have covered swine semen from foot-and-mouth disease countries since 1965. This new regulation included the specific conditions in the PRC that needed to be met. The comment period had been abbreviated because we wanted a final rule published and the semen collection completed before the insect vector season started for one of the diseases of concern. We stated that our procedures established that the donors were healthy and included tests and quarantine that were equivalent to those for live swine. We consider the semen no more of a risk (and perhaps less) than the live swine to introduce disease.

SUMMARY: APHIS believes the controversy was inspired partly by the fact that the PRC pigs imported by the Universities of Illinois, Iowa State, and the Agricultural Research Service are not supposed to be made available for public sale until 5 years of breeding research is completed, while Dekalb did not impose such a limitation on their imported semen. This appears to give an edge to Dekalb by allowing earlier marketing of their product. The swine group also said they had been denied the right to import semen. The PRC did have an agreement with APHIS to export swine as early as July 1986, but only agreed to export swine semen in September 1988, after the swine group already decided to import pigs instead.

PREPARED BY: Dr. David E. Herrick

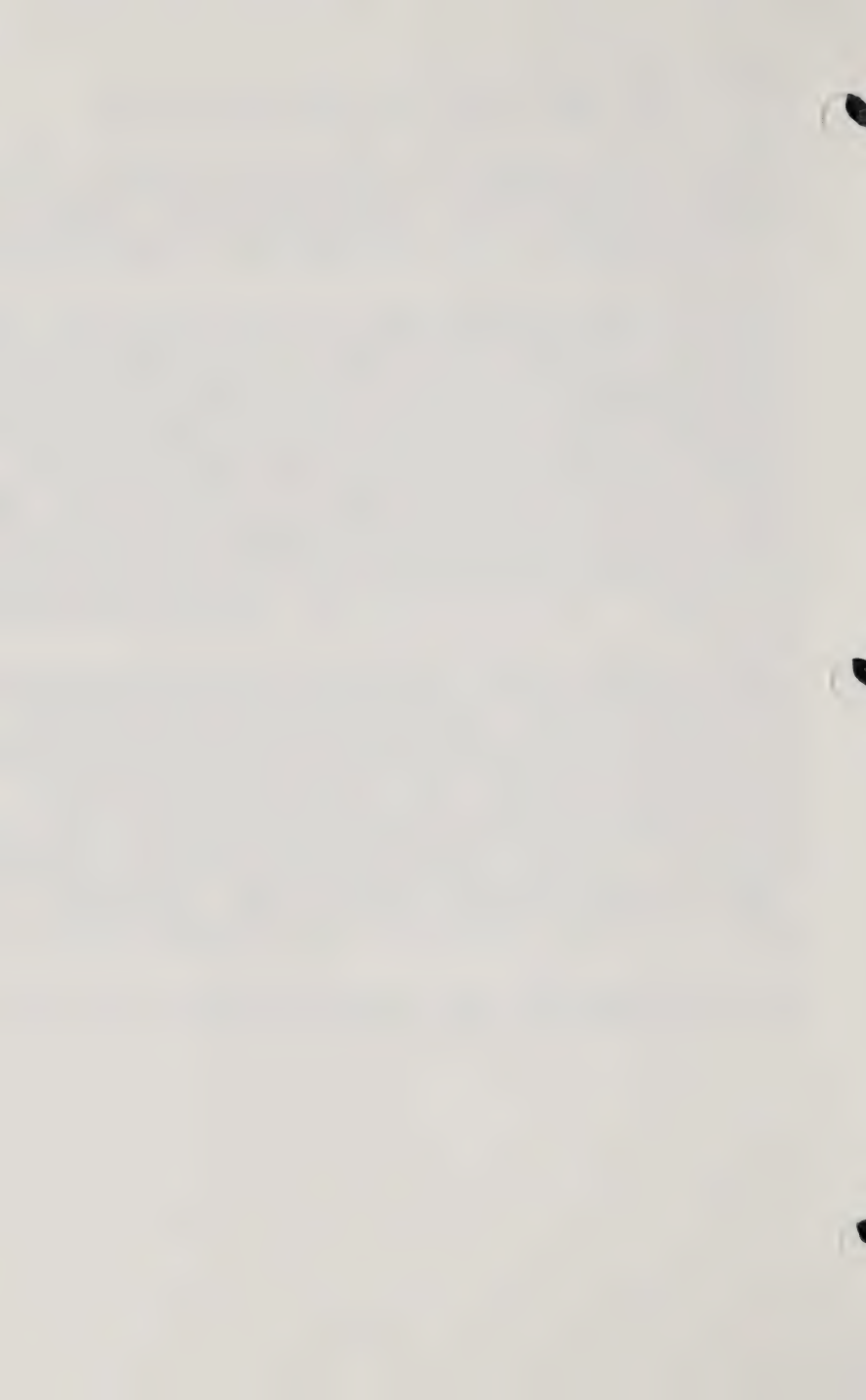
SUBJECT: 1989 Tripartite Meeting with Mexico, Canada, and the
United States in Fort Collins, Colorado, In June 1989

ISSUE: Once every 2 years, animal health officials from Canada, Mexico, and the United States participate in a joint meeting to discuss mutual problems related to animal health matters. While numerous items are discussed at this meeting, the emphasis is placed on subjects related to the import and export of animals and animal products, and standardization of import procedures for the three countries.

DISCUSSION: The United States discussed its scrapie program and its plan for negotiated rulemaking which is scheduled for 1989 and the problem with the importation of sheep and goats from Mexico. Canada explained its scrapie program and pressure it was under to relax its program. The hog cholera, tick, pseudorabies, and viscerotropic velogenic Newcastle disease problems in Mexico were reviewed by the Mexicans. All countries agreed to support Canada in its proposals to have regionalization of bluetongue accepted by the international community and to carefully evaluate and comment on zoo-sanitary protocols submitted by the International Office of Epizootics (OIE). The three countries also agreed to work toward standardization of animal disease tests and exchange information on emerging diseases and research studies on animal products. Requirements for the transit and importation of animals into the three countries were also discussed. The United States and Canada agreed to review Mexico's proposal for establishing a system for accrediting private veterinarians.

SUMMARY: Due to the nature of these meetings with three countries involved, forums of this nature are not conducive for country-to-country negotiations. For the most part, however, the meeting was informative and productive. Pre-meetings between USDA's Assistant Secretary for Marketing and Inspection Services and her Mexican and Canadian counterparts, where more critical issues were scheduled to be negotiated, had to be postponed when the Mexican Subsecretary had to cancel the trip to Colorado. The new requirements presented by the Mexicans at the meeting for exporting cattle, sheep, goats, horses, and swine from the United States to Mexico will cause unnecessary problems for U.S. exporters. USDA is preparing a response to the Mexicans indicating our disagreement with the new requirements. USDA intends to mount a vigorous campaign in an effort to get the Mexicans to rescind any unjustified requirements related to the export of livestock from the United States.

Prepared by: Dr. Harvey A. Kryder, Senior Staff Veterinarian, Import-Export Products Staff, Operational Support, Veterinary Services



Subject: Tropical Bont Tick (TBT) pilot eradication project in Antigua, British West Indies

Issue: The terms and conditions under which the Animal and Plant Health Inspection Service (APHIS) participates in a TBT Pilot Eradication Project planned for Antigua, British West Indies.

Discussions: On September 30, 1987, the Agency for International Development (AID) signed a Participating Agency Service Agreement (PASA) with the U.S. Department of Agriculture (USDA)/Office of International Cooperation and Development for a TBT Pilot Eradication Project on the Caribbean Island of Antigua. The operational or eradication component was to be carried out by APHIS with a total AID funding of \$3,060,000 over 3 years.

In February 1988, APHIS negotiated a cooperative agreement with the Government of Antigua and Barbuda which was submitted to AID for clearance. AID requested that APHIS add language to acknowledge the overall role of AID in financing and implementing the project. APHIS feels these points should be covered in a separate agreement between AID and USDA. This impasse has not yet been resolved.

In April 1988, APHIS developed plans and strategies for the TBT Eradication Project. APHIS determined that a new pour-on acaricide (flumethrin) would be safer, and less expensive than the two acaricides intended for spraying or dipping which are specified in the PASA. Flumethrin, although registered for use in certain foreign countries, is not approved by the Environmental Protection Agency (EPA) for use in the United States and, therefore, under current AID policy cannot be used in AID-financed projects. APHIS requested that AID support use of the product following exemption guidelines established by Environmental Protection Agency (EPA) for similar use patterns in the United States, which AID has so far refused.

Summary: AID has contracted with Dr. Roger Drummond (ARS-retired Director of Kerrville Research Center) to detail the scope of work necessary to perform the environmental assessment for the use of flumethrin for the TBT pilot eradication project. The assessment team has visited Antigua and at this point in time is in the process of preparing the analysis.

Prepared by: A. B. Thiermann, Deputy Administrator
International Services

SUBJECT: United States-Canada Free-Trade Agreement and
Harmonization of Animal Health Issues

ISSUE: The United States-Canada Free-Trade Agreement (FTA) calls for the harmonization of respective technical regulations and inspection procedures and the identification of those areas in which the two countries presently recognize equivalence.

DISCUSSION: One part of the FTA deals with animal health and sanitary barriers and proposes to harmonize or make equivalent all such barriers between the two countries. The following is a summary of the current status of issues indicated in schedule 4, Animal Health, of the U.S.-Canadian FTA:

1. Equivalency of export certification issued by accredited private veterinarians - Both Canada and the United States are in agreement and accept export certificates issued by accredited veterinarians provided the certificates are endorsed by official government veterinarians in the country of origin.
2. Equivalent procedures for veterinary biologics - The Canadians are planning to initiate testing of their veterinary biologics and have requested that USDA accept the Canadian test results for products to be exported to the United States. Since this is a new program, the Canadians are not expected to be able to initiate testing of their own biologics for several years.
3. Procedures and conditions to recognize regions free from specified animal diseases - Criteria for recognizing that a region is free from a specific disease will be evaluated and once agreed upon by the two countries, development of appropriate regulations will be initiated.
4. Elimination of State and Provincial restrictions related to the importation of animals and products - Discussions continue regarding the imposition of added fees by Canadians for the importation of U.S. bovine semen to be processed through Canadian artificial insemination inspection centers.
5. Direct Canadian importation without quarantine relative to bluetongue and pseudorabies - USDA and Agriculture Canada have worked out cattle export requirements to Canada involving a vector-free period relative to the incidence of bluetongue in each State. Proposed changes in Canadian regulations also include residency requirements and one bluetongue test in some cases. In the case of pseudorabies, USDA has proposed two action options for consideration by the Canadians to move U.S. slaughter swine to Canada without a 30-day quarantine prior to slaughter.

Summary: Because of a continuing cooperative effort on the part of both parties to resolve animal health issues, USDA sees no unsurmountable problems to bring about harmonization of the issues indicated in the FTA.

Prepared by: Dr. R. D. Whiting, Chief Staff Veterinarian, Import-Export Products Staff, Operational Support, Veterinary Services.

SUBJECT: Importation of Llamas and Alpacas from Chile

ISSUE: A proposed regulation to declare Chile free of foot-and-mouth disease (FMD) is expected to be published soon. A second proposal listing import health requirements for llamas and alpacas from Chile is also being developed. These actions will cause considerable controversy, a possible lawsuit, and efforts to prevent llamas and alpacas from being imported from Chile under import conditions less restrictive than those imposed while Chile was not recognized as being free of FMD.

DISCUSSION: The International Llama Association (ILA) has headed a movement to discourage these importations. The stated purpose of the group is to prevent the introduction of FMD into the United States. It should be noted, however, that llamas and alpacas in the United States have become extremely valuable animals, ranging from a few thousand dollars to over \$100,000 for top breeding sires. The release of a large number of animals into the United States at one time could have a significant depressing effect on those prices. The Government of Chile indicates that it plans to limit the number of alpacas and llamas under quarantine at any one time to 300 animals. Since the U.S. Department of Agriculture (USDA) will require a 60-day quarantine in Chile, this will result in only 1,200-1,800 animals being imported to the United States in any one year. The ILA would like to have all llamas and alpacas go through the USDA's maximum security quarantine facility for 90 days with complete FMD testing and be in contact with sentinel animals. This would have a discouraging effect on imports because of increased costs. Maximum security quarantine costs are several thousand dollars per animal where routine quarantine charges in other USDA facilities for 30 days would only be about \$200 to \$300 per animal. The USDA does intend to test these animals to detect FMD at our quarantine centers; however, the tests used will be modified and not nearly as costly as those used at our maximum security quarantine facility. Alpacas and llamas had been imported from Chile in 1983 when Chile was previously classified as being free of FMD, under conditions much the same as those being proposed at this time. There are about 300 importers who will want to import these animals if Chile is declared FMD free.

SUMMARY: Chile is expected to be declared FMD free very soon. Rulemaking is being prepared to outline health requirements, including tests for FMD, for animals imported through our regular quarantine stations. The ILA objects and has threatened an injunction and possible lawsuit if the regulation becomes final and alpacas and llamas are imported. The cost of these importations would be lowered dramatically under FMD-free status for Chile. The number of animals imported would increase, but still be limited by Chile.

Prepared by: Dr. S. Richeson, Senior Staff Veterinarian, Import-Export Animals Staff, Veterinary Services

SECRETARY'S ADVISORY COMMITTEE
ON FOREIGN ANIMAL AND POULTRY DISEASES

Colony Inn Hotel
1157 Chapel Street
New Haven, CT 06511
203 776-1234

Ball Room

August 17, 1989

7:00 a.m.	Buffet Breakfast	Hotel Restaurant
8:00 a.m. - 12:00 noon	Ostrich Meeting	Dr. Phyllis M. York Director, Recruitment and Development (Facilitator)
12:00 noon - 1:00 p.m.	Lunch	Ball Room East
1:00 p.m. - 5:00 p.m.	Executive Session Draft Committee Resolutions	

SUBJECT: Entomological Aspects of Amblyomma gemma, A. lepidum, and Hyalomma albiparmatum, Found on Recent Imports of Ostriches.

ISSUE: Three species of exotic ticks, Amblyomma gemma, A. lepidum, and Hyalomma albiparmatum, have been collected and identified from adult ostriches recently imported into the United States.

DISCUSSION: All three species of ticks found on the ostriches have similar life cycles, i.e., they are all three-host ticks. Three-host ticks feed to repletion as larvae on one host, drop to the ground, and molt to the nymphal stage. The nymphs attach to another host and feed to repletion, drop to the ground, and molt to the adult stage. The adults then attach and feed on a third host. Depending on the species of tick, each stage feeds for 5 to 12 days. After engorgement, the adult female drops off the host and finds a protected place and then lays several thousand eggs. Under ideal conditions, the complete life cycle, from egg to engorged female, takes from 3 to 5 months. As adults, these ticks will feed on almost any large mammal or bird. The preferred host varies with each species, but all favored hosts are large herbivores. The immature stages (larvae and nymphs) prefer to feed on small animals, such as rodents, hares, and ground-dwelling birds, but are occasionally found on larger animals as well. Because of the wide variety of hosts utilized by these ticks during the completion of their life cycle, both our domestic livestock and native wildlife populations are at risk.

Infestations of these species on livestock may cause unthriftiness, weight loss, milk loss in dairy animals, anemia by exsanguination, and hide damage. Moreover, wounds created by feeding ticks are subject to secondary bacterial infection. Two of these species, A. gemma and A. lepidum, are proven vectors of heartwater, a rickettsial disease of ruminants. In addition to transmitting heartwater, A. gemma also transmits Nairobi sheep disease. The species of Hyalomma is not known to be a vector of any livestock disease.

SUMMARY: Three species of exotic ticks were recently imported on adult ostriches from Africa. Because there are areas in the United States that are ecologically favorable for the establishment these ticks, they all have the potential of becoming serious pests of our nation's domestic livestock and native wildlife. Premises with tick-infested ostriches are now under quarantine and the ostriches and premises are being systematically treated with an acaricide to ensure that these ticks do not become established in the United States.

Prepared by: D. D. Wilson, Senior Staff Entomologist, Cattle Diseases and Surveillance Staff, Veterinary Services.

SUBJECT: The Incursion of Exotic African Ticks Through the Importation of Ostriches

ISSUE: The introduction of exotic African ticks into the United States and procedures to eliminate them

DISCUSSION: A shipment of 44 adult ostriches were imported from Zimbabwe and quarantined at the Hendee's Zoological Company, a private quarantine facility, in Mundelein, Illinois, on April 2, 1989. Twenty-five of the adult ostriches were released from quarantine on May 2, 1989. They were shipped to eight premises in Texas, Oklahoma, Ohio, and Illinois. Exotic ticks were found on three premises in Texas and one premises in Ohio.

A treatment protocol has been developed and implemented. Sentinel animals (rabbits, birds, or steers) have been placed on all farms/premises until frost or the threat of tick infestation has passed. USDA's Animal Damage Control personnel and personnel from the Southeastern Cooperative Wildlife Disease Study have trapped small mammals and birds on farms that received adult ostriches so they could be examined for ticks. As of July 18, 1989, only domestic ticks have been found on the wildlife.

Approximately 800 ostriches in 14 shipments have been released since January 1, 1989. About two-thirds have been juveniles and no ticks have been found on any of the juvenile ostriches. Each group of ostriches imported since January 1, 1989, through privately-owned quarantine facilities, has been inspected for ticks. No ticks have been found on any juvenile ostriches that have been released from quarantine stations.

The importation of ostriches has been suspended by USDA until disease and pest risks associated with ostriches can be evaluated. A public hearing for receiving comments from concerned parties is planned for August 1989. The information generated by this meeting and USDA Staff will be considered by the Foreign Animal Disease Advisory Committee which will also meet in August.

SUMMARY: Adult ostriches were imported and released from an approved quarantine facility with exotic African ticks. All adult ostriches have been located and a quarantine and treatment protocol implemented to ensure that all infested ostriches and exposed premises are properly treated and exotic ticks do not become established in the United States. Sentinel animals have been placed on farms that received adult ostriches. Ostrich importation has been suspended until the disease and pest risks can be evaluated.

Prepared by: J. L. Williams, Senior Staff Veterinarian, Emergency Programs, Veterinary Services.

FUTURE OF THE RATITE (OSTRICH) INDUSTRY IN THE UNITED STATES

The following is a generic-type statement of the past, present, and possible future of the Ratite industry in the United States. It is obvious that any such endeavor can take myriad forms, and this statement is designed to be read by persons who are well-acquainted with the subject, by those who are possibly interested in the subject, by those who have never heard of a Ratite, by elected officials who deal in agriculture, and by governmental agencies which make policy concerning imports. Whereas the Ratite family consists of Ostriches, Emus, Rheas, and Cassowaries, this letter shall primarily refer to ostriches. The conclusions, however, will apply to all Ratites.

For some five years there has been some degree of interest in the development of a new industry in the United States. There has been a tremendous growth of interest and actual participation in the promotion of the ostrich industry with exponential growth in 1987 and 1988. Hundreds of U.S. citizens have invested large sums (some their entire life-savings) in young birds, pens, barns, fences, incubators, hatcheries, feed, vitamin and mineral supplements, travel and educational costs in order to participate in raising ostriches. More hundreds and even thousands are planning to enter the field after some of the early problems have been solved. To this time some of the enthusiasm can be listed in a very incomplete list of developments:

1. Organization of several national and regional associations.
2. Intense research at universities such as Texas A&M University and Oklahoma State University.
3. Development of new technology in incubators and hatcheries, demanded by breeders.
4. Research and development of special feeds and supplements by countless feed companies all over the country.
5. Enthusiastic support of a viable new industry by the Departments of Agriculture of numerous states, particularly Texas and Oklahoma, but interest in as many as 30-45 states.
6. Establishment of state-guaranteed loans and, in some instances, grants for financing of ostrich-growing.
7. Establishment of numerous periodicals designed to promote, report, and educate. Some, but certainly not all, include the Ostrich News, Ostrich Report, Rare Breeds Journal, Animal Finder's Guide, and Exotic Wildlife.

All of the various aspects of a viable, exciting, developing industry are now in place. The natural progression is a rapidly-expanding industry which includes thousands of people who contribute in varying degrees, much as the present poultry or cattle industries now operate in this country. If this industry is allowed to progress in its logical fashion, there is room for everyone from the small farmer who is presently in trouble because of low farm prices, but can afford a single breeding pair, all the way to the large breeder with vast facilities and large numbers of birds. The prices for breeders during the early years will remain sufficiently high to keep both the interest and income at a sufficient level, and at some point in time the increasing supply of birds will dictate a reduction in the price of the individual bird, a smaller market for young breeder birds, and will lead to a slaughter market. During the development of the number necessary for a slaughter market, feathers may be harvested for sale to offset expenses, and ultimately the birds will come to slaughter for meat and leather.

The net result therefore will be a vast complex comprised of the following:

1. Thousands of jobs generated in the breeding, hatching, rearing, sale, and transportation of birds;
2. Hundreds of jobs for veterinarians to care for the birds;



3. A vast market for farmers who will supply the corn, alfalfa, maize, soy beans, kale, oats, wheat, and other farm products which will provide the feed;
4. Hundreds of new jobs generated by feed mills which will formulate, manufacture, sell, and deliver the feed;
5. Hundreds of new jobs generated by trucking companies for transportation;
6. Hundreds of new jobs generated by slaughter plants;
7. Hundreds of new jobs generated by meat-packing plants;
8. Hundreds of new jobs generated by leather tanneries;
9. A vast supply of ostrich leather products which can be manufactured in this country for sale anywhere rather than being manufactured overseas for sale in the U.S.;
10. A large list of miscellaneous industries, small and large, e.g.;
 - a. Auctions, handling personnel,
 - b. Drug companies which supply medicines and vitamin supplements,
 - c. By-products such as dog food, fertilizer, other animal foods,
11. All the taxes which would be paid to all the involved governmental agencies in the form of permits, licenses, direct taxes, property taxes, and income taxes from all the people employed in the industry;

and finally, the big picture of an American industry which employs Americans, pays Americans, buys American, sells American, and does not add to the foreign debt and deficit.

In the above scenario, everyone wins; everyone shares according to his or her ability, drive and perseverance; and there is development of a truly American, entrepreneurial industry.

As outlined, there is no down-side. There is one possible act which can, to some extent already has, and will totally destroy this budding industry - the importation of foreign birds.

During the past few years, there has been a rapidly-increasing number of Americans who have gone to many countries in the world in order to arrange for importation of birds. Whereas some have thought that the importation of a few ostriches would produce a fast profit and some have even justified this importation as "introducing new blood", the vast majority of the importers have only the fast profit motive in mind. Some have been deceived by the sellers (and even by themselves) that "I am the only one who can import birds". The numbers of ostriches brought in presently are increasing exponentially as more and more people buy foreign birds. Since most (90%) of all ostriches in the world originate in South Africa and since the United States has sanctions against South African agricultural products, how can large numbers of birds be imported into the United States?

1. South African owners can easily take birds from South Africa to a neighboring country from which they can be imported.
2. African birds can and are taken to countries who are friendly to both the U. S. and South Africa and from there be brought to the U.S. Examples: Portugal, Canada, Israel.
3. South African interests have already defeated the purpose of the U.S. sanctions by placing a leather tannery in Botswana. The leather from that tannery has been sufficiently "processed" to please the U.S. Customs Service and qualify for importation.
4. Hundreds of Africans have become "suppliers" of "no questions asked or answered" ostrich sales.

There is sentiment that the South African bird owners have devised a plan to destroy the U.S. market before it develops. A very large number of adult breeding birds (numbering in the thousands) will be given, loaned, or sold at a small price to a single American. The importation of such a vast number would kill the American industry overnight. The U.S. "owner" would then use one feed company, have one set of employees, have the birds in one geographical area, and completely control the industry. In that way the Africans would hold their production high, manage the U.S. production to a point just low enough to keep the industry suppressed, and control the world market. Think it can't happen? Think again. OPEC has determined that American oil will sell for about \$15-17 per barrel - ask all the Texas, Oklahoma and Louisiana oil men their opinions.

How can we prevent this destruction? Why should we even try? The first reason is very basic. We must insist that quarantine practices are immediately changed. Importers are quick to point out that their ostriches have "passed quarantine." Do you know what "quarantine" means for ostriches (or any other Ratite)? Quarantine stations check them for Newcastle disease and Newcastle disease only! That procedure is designed to protect the U.S. poultry industry and is understandable and commendable, but it does nothing for the imported birds and it certainly does nothing for the domestic U.S. birds. There is nothing wrong with checking for Newcastle disease but, it is far more important to check them for ostrich diseases. They must be checked for wire worms. Introducing "new blood" into an existing flock of birds may be introducing more than different genes. Meaningful, tough, uncompromising quarantine is mandatory - now.

Secondly, we must insist that the laws presently on the books are followed. The subterfuge of taking birds to Israel or Portugal for a few days or weeks before shipment should not be condoned nor tolerated. Such transparent transactions make a mockery of our laws and of the governmental processes which resulted in their passage. A South African bird who spends a weekend in Portugal is still a South African bird. Even easier is the routing of birds through Israel or Canada, two countries which we have taught never to question. See the attached advertisement. Finally, we must insist that the importation of foreign birds be prohibited. Breeders who desire new genes can sell or trade birds among the hundreds of owners of U.S. birds. Surely there are enough widely-separated farms with good record-keeping to supply the demand.

By prohibiting the importation of foreign birds, we can develop a viable industry, prevent the totally-unregulated (and often illegal) acquisition of birds, prevent the massive "killer" importation, and avoid disease-contamination of our existing flocks.

If we do not prohibit importation of ostriches from foreign countries, there will be no United States ostrich industry except for a single or few larger enterprises. Our government gives a tremendous amount of lip-service to protection of American jobs, and the ever present question of the trade deficit, and yet it is well within its power to reverse a portion of the outflow, show the American farmer some support, and nurture the long-heralded but rapidly-disappearing "American Spirit", if it so desires. It is up to each of us to see that it does.

Do not depend upon any association as this is a matter for individual action. Associations do not vote; individual do vote; and your elected officials must hear from you.

We are requesting three things from you:

1. Enclosed is a petition which we are requesting that you read, sign, date and return to the following address:

Roy E. Kimsey, Jr. ~
505 N. Big Spring St., #502
Midland, TX 79701-8602
2. Please make copies of this letter and the petition, sign the petition, and mail to your own United States Representative. You may also send the letter to anyone else whom you choose.
3. DO NOT mix foreign birds with your existing flocks.

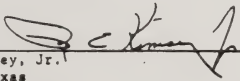
When the returned petitions have been collected, they will be forwarded to the appropriate officials.

This letter is being sent to the following officials now and the petitions will be forwarded when they can be received. They will have had the letter and be aware of the problem by the time that the petitions arrive.

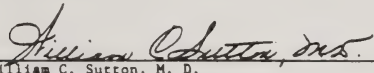
George Bush
Robert Mosbacher
Clayton Yeutter
Lloyd Bentsen
Phil Gramm
William Clements
Jim Hightower
David Boren
Don Nickels
Henry Bellmon
Jack D. Craig

President of the United States
Secretary of Commerce
Secretary of Agriculture
U. S. Senator, Texas
U. S. Senator, Texas
Governor, State of Texas
Agriculture Commissioner, Texas
U. S. Senator, Oklahoma
U. S. Senator, Oklahoma
Governor, State of Oklahoma
Agriculture Commissioner, Oklahoma

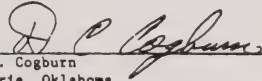
Sincerely,



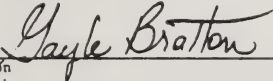
Roy E. Kimsey, Jr.
Midland, Texas



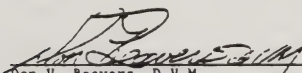
William C. Sutton, M. D.
Chulagua Game Ranch
Houston, Texas



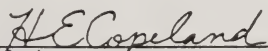
D. C. Cogburn
Guthrie, Oklahoma



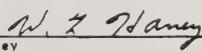
Gayle Bratton
G & B Ostriches
Wimberley, Texas



Don V. Beavers, D.V.M.
Lawton, Oklahoma



H. E. Copeland
Jackie's Ostrich Yard
Marble Falls, Texas



W. T. Haney
Big Tex Ostrich Ranch
Angleton, Texas

DEPARTMENTAL REGULATION		NUMBER: 1043-3
SUBJECT: RENEWAL OF ADVISORY COMMITTEE ON FOREIGN ANIMAL AND POULTRY DISEASES	DATE: August 25, 1988	
	OPI: Animal and Plant Health Inspection Service	

1 PURPOSE

- a This regulation renews the Advisory Committee on Foreign Animal and Poultry Diseases. The purpose of the Committee is to advise the Secretary on means to prevent, suppress, control or eradicate an outbreak of foot-and-mouth disease or other destructive foreign animal or poultry diseases in the event such diseases should enter the United States.
- b The renewal of this Committee is in the public interest in connection with the duties and responsibilities of the Department to deal with any outbreak of foot-and-mouth disease or other foreign animal or poultry disease. The Committee provides an essential function concerning duties and responsibilities imposed on the Department by law.
- c The United States must maintain constant vigilance in order to prevent the introduction of foot-and-mouth disease and other animal and poultry diseases foreign to this country. The economic consequences of such outbreaks would have disastrous effects on all segments of the public because of ever-changing methods of livestock and poultry production and distribution. The effectiveness of the Department's program to prevent, control, or eradicate any outbreak of foreign animal or poultry disease among the Nation's livestock and poultry populations can be increased by tapping the experience and knowledge of representatives of the livestock and poultry industry.

2 SPECIAL INSTRUCTIONS/CANCELLATION

- a It is anticipated that the Committee will meet annually. The Committee will terminate 2 years from the date of this regulation because the purposes of the Committee could not be accomplished in less than 2 years.
- b Departmental Regulation No. 1043-3 dated August 21, 1986, is hereby superseded.

3 OFFICERS AND MEMBERSHIP

- a The Assistant Secretary, Marketing and Inspection Services, will be the Chairperson to whom the Committee will report. The Administrator, Animal and Plant Health Inspection Service,

will be Vice Chairperson. In the absence of the Chairperson, the Vice Chairperson will act in his stead. A representative of the Animal and Plant Health Inspection Service will serve as Executive Secretary and will provide the necessary staff support for the Committee. Members of the Committee will be appointed by the Secretary.

- b The Committee will have a balanced membership, and will follow equal opportunity practices, in line with USDA policies, in all appointments to it.

4 DUTIES

The duties of the Committee involve advising and counseling the Department on: (a) plans and recommendations for regulatory actions in the event of a foreign animal or poultry disease outbreak; (b) problems associated with control and/or eradication measures to cope with an outbreak of a foreign animal or poultry disease; (c) changing practices in the production and marketing of livestock, poultry, and recent developments in research and regulatory veterinary medicine; (d) developing effective measures for informing livestock and poultry producers concerning the handling and treatment of unusual or suspicious animal or poultry disease problems; and (e) regulations pertaining to imports of animals, poultry, and their products.

5 ESTIMATED ANNUAL OPERATING COSTS

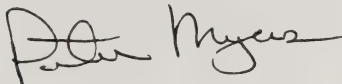
- a The estimated annual costs would be as follows:

<u>ITEMS</u>	<u>ESTIMATED COSTS</u>
Federal salaries (Professional and secretarial)	\$10,700
Per diem and transportation expenses for Federal and Non-Federal members	\$14,596
Supplies and Materials	500
Total	\$25,796

- b The estimated expenses represent all public and private funds to be spent by or on behalf of the Committee.
- c Support to the Committee will be provided by the Animal and Plant Health Inspection Service, U.S. Department of Agriculture.

6 NUMBER AND FREQUENCY OF MEETINGS

Meetings will be held annually or as the Secretary deems necessary.

A handwritten signature in dark ink, appearing to read "Peter Myers". The signature is fluid and cursive, with the first name "Peter" written in a larger, more prominent script than the last name "Myers".

PETER C. MYERS
Acting Secretary

SECRETARY'S ADVISORY COMMITTEE ON
FOREIGN ANIMAL AND POULTRY DISEASES
JUNE 15-16, 1988

The Secretary's Advisory Committee on Foreign Animal and Poultry Diseases met in Room S-313, South Building, Washington, D.C. The meeting times were from 8:15 a.m. to 4:10 p.m. on June 15, and from 8:15 a.m. to 12 noon on June 16, 1988.

Members present included the following: Dr. James A. Acree, Mr. Neil F. Black, Mr. Clint Booth, Mr. Dan B. Childs, Mr. John R. Dahl, Mr. Don Gingerich, Dr. John P. Kluge, Mr. James Nofziger, Mr. Dean Pridgeon, Mr. Jack Rundquist, and Mr. James H. Whitmore.

Dr. James W. Glosser, Administrator, Animal and Plant Health Inspection Service (APHIS), welcomed the Committee and reviewed changes which are planned within APHIS. These changes are designed to prevent and to resolve problems, to have a structure that will be pro-active and not reactive, to deliver services and programs effectively and efficiently, and to be structured to meet the challenges of the 21st century.

Dr. Kenneth A. Gilles, Assistant Secretary for Marketing and Inspection Services, U.S. Department of Agriculture (USDA), during the morning session also welcomed the Committee and presented certificates of appreciation to each member while photographs were being taken. Dr. Gilles also reviewed some of the problems and challenges of APHIS and discussed the need for change to be prepared to deal with the complex problems of new agricultural technologies involving genetic engineering, embryo importations, vaccines for exotic diseases, and the desire to import more and different species of animals into the United States. He reported that the proposal to consolidate the Foreign Animal Disease Diagnostic Laboratory of APHIS with the Agricultural Research Service facility in one building at the Plum Island Animal Disease Center is progressing, and that \$9 million have been made available for this purpose.

Dr. Glosser reported on the recent meeting of the Office of International Epizootics and on the European Economic Community's (EEC) goal for proposed common animal and animal products regulations for movement into, between, and within member countries by 1992.

During the meeting on June 15, 1988, the Committee received information and presentations pertaining to the following: considerations for recognizing countries to be free of diseases exotic to the United States disease monitoring and laboratory facilities in Haiti, animal importation, tropical Bont tick program in the Caribbean, African horse sickness outbreak in Spain, Serrano ham importation, exotic poultry diseases, activities and diagnostic capabilities of the National Veterinary Services Laboratories, Ames, Iowa, and Plum Island, New York, activities and plans of the Agricultural Research Service for the Plum Island Animal Disease Center, disease consideration of bovine embryo importations, the North American Foot-and-Mouth Disease Vaccine Bank, and Public Awareness support for preventing outbreaks of foreign animal diseases.

On Thursday, June 16, 1988 the Committee met and reviewed the actions, recommendations and comments involving the 1987 meeting. The Committee

continued discussions and made the following recommendations, statements, and resolutions:

1. The Committee commends APHIS, Veterinary Services, for the hog cholera surveillance conducted on the Islands of Santa Cruz and Santa Rosa, California, in response to a resolution by this Committee. The data developed by the survey resulting in the conclusion that hog cholera does not remain viable in the feral population are a valuable contribution to our knowledge regarding that disease and justifies the survey, even if there were no other benefits. The Committee notes the sentence on page 6 of the final report of the project: "The National Park Service plans to eradicate the wild swine." In view of actions on nearby islands with other species that were eliminated from the island by transferring them to the mainland, the Committee cautions that the prevalence of pseudorabies in these populations, as evidenced by the pseudorabies virus antibody titers found in the feral pigs, makes them a hazard to the domestic swine population on the mainland. The Committee would therefore urge APHIS to make the National Park Service aware of this potential hazard and to oppose any attempts to eliminate the swine population of these islands by movement to the mainland.

Moved by: Dr. Acree

Seconded by: Dr. Kluge

2. In view of the intention of the EEC to institute common animal and animal product regulations by 1992 which would jeopardize the free status of some countries of the EEC with regard to a number of animal diseases exotic to the United States; In view of the hazard such a relaxation of regulations on animals and animal products between countries of the EEC could pose to the U.S. livestock industry;
And in view of the United States' policy of recognizing individual countries of that region free of specific diseases and permitting movement of animals and animal products from those countries to the United States;

Therefore, be it resolved by the Secretary's Advisory Committee on Foreign Animal and Poultry Diseases that United States' trade negotiators inform the countries of the EEC that such a change in regulations on animals and animal products would necessitate the U.S. considering the EEC one country for the purposes of import regulations on animals and animal products into the United States. Such an action would mean that if foot-and-mouth disease, African swine fever, hog cholera, swine vesicular disease, or any other animal disease exotic to the U.S. existed in any of the countries of the EEC, it would be considered to exist in all of them, and exports of animals or animal products to the United States from any country of the EEC would be prohibited.

Moved by: Mr. Childs

Seconded By: Mr. Nofziger

3. Whereas, African swine fever (ASF) is considered the most significant disease of swine because of its morbidity and mortality effects;
Whereas, there is no vaccine to prevent ASF;
Whereas, the only recourse the swine industry has if the disease is introduced into a country is to kill all infected and exposed swine;
Whereas, this approach may be obsolete in this era;
Whereas, the United States has invested \$34,000,000 to free the Dominican Republic and Haiti of ASF;
Whereas, if diseases such as ASF or hog cholera were introduced into Haiti or the Dominican Republic, all of the efforts made to eliminate ASF and repopulate the swine populations would be lost;
Whereas, the history of ASF has shown that when it exists in a country, periodic outbreaks occur in nearby countries, so if it reappears in Haiti or the Dominican Republic it will be a threat to countries of the Caribbean and

North America.

Therefore, be it resolved that APHIS take whatever action is necessary to initiate an effective animal health program in Haiti that includes activating the laboratory and implementing a surveillance program.

Moved by: Mr. Gingerich

Seconded by: Mr. Whitmore

4. Whereas, the presence of Heartwater and its vector, the Bont tick, in the Caribbean represent a continuing threat to the United States' cattle industry;

Whereas, the vector of the disease continues to spread through the island of the Caribbean;

Whereas, a program to eradicate both the disease and its vector from Antigua has been developed by APHIS as a proposed joint effort with U. S. Agency for International Development;

Whereas, progress toward implementation of the program in Antigua appears to be stalled;

Whereas, the Committee on FAPD views with great concern this lack of action on implementing this program and the extreme hazard this inactivity poses to the United States' cattle industry.

Therefore, be it resolved that the FAPD Committee urges the Secretary of Agriculture to immediately take steps with appropriate officials of the State Department to stimulate resumption of discussions between the two departments aimed at early implementation of the plan for Antigua.

Moved by: Dr. Acree

Seconded by: Mr. Rundquist

5. Whereas, APHIS has been involved in developing a protocol for determining the safety of the procedures for the production of Serrano hams in Spain with regard to diseases exotic to the United States;

Whereas, this protocol would appear to provide a statistically valid determination of the safety of this processing method.

Therefore, the FAPD Committee commends APHIS for the position it has taken with regard to this issue. The Committee also takes note of the fact that Spanish interests will finance the United States research required to establish the safety of these processing techniques. This conforms with a resolution of this Committee of several years ago and the U.S. Department of Agriculture is commended for instituting this policy.

Moved by: Mr. Gingerich

Seconded by: Dr. Acree

The above recommendation was amended with the suggestion:

Also, the Committee suggests that consideration be given to obtaining samples from a significant number of Serrano hams produced from pigs from areas of Spain where ASF is endemic and testing the samples for the diseases of interest. This procedure is to be a preliminary to the testing protocol outlined to the Committee.

Moved by: Mr. Gingerich

Seconded by: Mr. Nofziger

6. Whereas, the facility's consolidation plans as well as the long-range plans for research at the Plum Island Animal Disease Center (PIADC) appear to be in conformity with the previous positions of this Committee on PIADC; Whereas, the innovative long-range planning for PIADC, including the proposal for bringing scientist and technical staff commuters from Connecticut as well as New York appears to resolve long-standing problems at the institution.

Therefore, the FAPD Committee commends and encourages the Director of PIADC in his plans for reorganization and long-range planning as outlined to the Committee.

Moved by: Mr. Whitmore

Seconded by: Mr. Booth

7. Whereas, Harry S Truman Animal Import Center (HSTAIC) was financed by the Congress as a result of requests from the food animal industry for the purpose of safe importation of food animal genetics.

Therefore, be it resolved that HSTAIC be used when requested by the food animal industry for importation of breeding stock to improve genetic stock in the U.S. and only for importation of other species when not required by the food animal industry.

Moved by: Mr. Rundquist

Resolved by: Mr. Whitmore

8. That the Committee urge the Secretary to lend full support to the Administrator of APHIS in the establishment of a meaningful dialogue with responsible members of the animal rights movement. It is imperative that such dialogue be established to reduce the opportunity for the irresponsible animal rightists to force unacceptable legislation on the food, animal, and poultry industries.

Moved by: Mr. Nofziger

Seconded by: Mr. Gingerich

9. "The Committee recommends that the Secretary establish early contact with the Administrator of the Environmental Protection Agency to resolve many problems associated with the disposal of animal carcasses and/or products in the event of an emergency disease outbreak." The Committee reaffirmed the above resolution of 1987 and requested that each State Environmental Protection Agency be contacted to determine the possibility of disposing infected and exposed carcasses by burial, burning, or rendering, and submit a report of the finding to the Committee by January 1, 1989.

Moved by: Mr. Dahl

Seconded by: Mr. Black

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Clint Booth
Booth Energy Co.
4242 Lomo Alto Dr. Suite 1101
Dallas, Ts 75219

TITLE:

President/Owner - Geologist

AGRICULTURE AFFILIATIONS:

National Cattlemen
Tx & SW Cattle Raisers

OTHER AFFILIATIONS:

Past Member of FAPD

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Edward T. Braye
Large Animal Care Center
School of Veterinary Medicine
Tuskegee University
Tuskegee, Alabama 36088

TITLE:

Veterinarian, Professor and Head-
Department of Large Animal Medicine & Surgery

AGRICULTURE AFFILIATIONS:

US Animal Health Assoc.
on President's Council of
Food & Nutrition 1975-77

OTHER AFFILIATIONS:

Completed foreign animal
disease course sponsored by USDA

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Everett S. Bryant, D.V.M.
The University of Connecticut
Department of Pathobiology
Box U-89, 61 North Eagleville Road
Storrs, Ct 06269-3089

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Professor/Veterinarian

AGRICULTURE AFFILIATIONS:

Am. Vet. Med. Assoc
US Animal Health
Am. Assoc. of Avian Path.
Am. Assoc. of Vet. Lab. Diag.

OTHER AFFILIATIONS:

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Ronald M. Cameron
Mountaire Corporation
PO Box 5726
North Little Road, AR 72119

TITLE:

President/CEC

AGRICULTURE AFFILIATIONS:

National Brioler Council
SE Egg Council

OTHER AFFILIATIONS:

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Dan B. Childs
John D. & Catherine T. MacArthur Foundation
4176 Burns Road
Palm Beach Garden, FL 33410

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General Manager

AGRICULTURE AFFILIATIONS:

National Cattlemen
US Animal Health
FLA. Cattlemen

OTHER AFFILIATIONS:

Past Member of FAPD

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

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Lexington, KY 40505

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AGRICULTURE AFFILIATIONS:

Am. Vet. Med. Assoc.
Am. Assoc. of Equine Practitioners
KY Vet. Med. Assoc.
American Horse Council

OTHER AFFILIATIONS:

Horse Council

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Jack Dahl
Dahl Land and Cattle Co.
Guckle, ND 58442

TITLE:

President

AGRICULTURE AFFILIATIONS:

National Cattlemen's Association
Pan American Health Organizations
U.S. Animal Health Organization
Active Republican

OTHER AFFILIATIONS:

FAPD member since 1982

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Don D. Gingerich
R R 1 Box 126
Parnell, Iowa 52325

TITLE:

Farm Owner and Operator

AGRICULTURE AFFILIATIONS:

National Pork Producers Council
Farm Bureau
Corn Growers
Iowa Cattlemen Association

OTHER AFFILIATIONS:

Worked on national and state
pseudorabies program.
Worked in Haiti through
USAID on African Swine Fever.

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Tommy Lee Goodwin
Pilgrim's Pride Corporation
P.O. Box 93
110 South Texas Street
Pittsburg, TX 75686

TITLE:

Senior Vice President
Research & Development &
Quality Assurance

AGRICULTURE AFFILIATIONS:

Poultry Science Assoc.
World Poultry Science Assoc.
Institute of Food Tech.

OTHER AFFILIATIONS:

Published many poultry articles.

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Arlene Hansen Ham
116 Crestridge
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TITLE:

Owner/ Realty World-Conrad

AGRICULTURE AFFILIATIONS:

Montana Veterinary Medical Auxiliary
Western States Veterinary Medical Auxiliary
Montana Cowbells
South Dakota Cowbells

OTHER AFFILIATIONS:

US West Communication - Board of Directors
Chairperson - Rio Grande Water Compact
South Dakota Racing Commission

BIOGRAPHICAL SKETCH

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Washington Regional Primate Research Center
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Primate Supply Information
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Veterinarian

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OTHER AFFILIATIONS:

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TITLE:

AGRICULTURE AFFILIATIONS:

Farm Bureau
Nat. Pork Producers

OTHER AFFILIATIONS:

Farm Bureau

BIOGRAPHICAL SKETCH

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TITLE:

President & CEO

AGRICULTURE AFFILIATIONS:

Liv. Conserv. Inst.
US Animal Health

OTHER AFFILIATIONS:

BIOGRAPHICAL SKETCH

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Texas A & M Research and Extension Center
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TITLE:

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AGRICULTURE AFFILIATIONS:

Am. Vet. Med. Assoc.
US Animal Health
Am. College of Vet.
Microbiologist
Tx Sheep & Goat Raisers
Am. Assoc. of Vet. Med. Diag.

OTHER AFFILIATIONS:

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Victor F. Nettles, JR.
The University of Georgia
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Athens, Georgia 30602

TITLE:

Wildlife Veterinarian/
Professor and Director of the
Southeaster Cooperative Wildlife Disease Study

AGRICULTURE AFFILIATIONS:

Wildlife Society
Wildlife Disease Assoc.
Am. Vet. MEd. Assoc.
International Assoc. of Fish & Wildlife
Am. Assoc. of Wildlife Vet.
US Animal Health

OTHER AFFILIATIONS:

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

James Curran Nofziger
7252 Remmet Avenue
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TITLE:

Consulting Animal Nutritionist

AGRICULTURE AFFILIATIONS:

Am. Society of Ag. Consultants
Am. Society of An. Science
Am. Dairy Science Federation

OTHER AFFILIATIONS:

Past member of FAPD

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Charles F. Parker
The Ohio State University
Department of Animal Science
110 Animal Science Building
2029 Fyffe Road
Columbus, Ohio 43210

TITLE:

Chairman/Professor

AGRICULTURE AFFILIATIONS:

Council for Ag. Sci. & Tech.
Am. Society of An. Sci.

OTHER AFFILIATIONS:

Work for USDA-ARS.
Sheep Industry

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Walter C. Stemler
R. R. 2 Box 201
Waterloo, IL 62298

TITLE:

Self Employed Dairy Farmer

AGRICULTURE AFFILIATIONS:

US Animal Health
Livestock Con. Inst.
MidAmerica Dairymen
National Milkproducers

OTHER AFFILIATIONS:

MilkProducers

BIOGRAPHICAL SKETCH

NAME AND ADDRESS:

Arthur Vincent Tennyson
American Veterinary Medical Association
930 N. Meacham Road
Schaumburg, Il 60196

TITLE:

Veterinarian/
Director of Membership and Field Services

AGRICULTURE AFFILIATIONS:

Am. Vet. Med. Assoc.

OTHER AFFILIATIONS:

Addresses For Advisory Committee

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930 N. Meacham Road
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RECOMMENDED:

Administrator
Animal and Plant Health Inspection Service

CONCURRED:

Assistant Secretary for Marketing and Inspection Service

APPROVED:

Assistant Secretary for Administration

DATE:

OFFICE
OF THE
ADMINISTRATOR 34 01

INTERNATIONAL SERVICES	SES Therman 34 20
15 Nelson	
FIELD UNITS	
15 Campbell	
14 Garrett	
OPERATIONAL SUPPORT	
34 20 04	
14 Smith	
RESOURCE MANAGEMENT	34 20 01

ANIMAL DAMAGE CONTROL	SES Packham 34 70
15 Ayres	
15 Hawthorne	
15 Abraham	
REGIONAL OFFICES	
34 70 (20, 30)	
14 Lenton	
OPERATIONAL SUPPORT	
34 70 04	
13 Johnson	
RESOURCE MANAGEMENT	34 70 02

PLANT PROTECTION AND QUARANTINE	SES Helms 34 30
SES Beckus	
SES Lee Lee	
SES Elder, Granberry	
REGIONAL OFFICES	
34 30 (22, 27, 32, 37)	
SES Williamson	
OPERATIONAL SUPPORT	
34 30 07	
14 Eggert	
RESOURCE MANAGEMENT	34 30 03

VETERINARY SERVICES	SES King 34 50
SES Johnson	
SES Bluch, Konyha	
Harrington, Vacant	
REGIONAL OFFICES	
34 50 (21, 26, 31, 41)	
SES Vacant	
OPERATIONAL SUPPORT	
34 50 06	
14 Lohry	
RESOURCE MANAGEMENT	34 50 04

REGULATORY ENFORCEMENT AND ANIMAL CARE	SES Andros 34 60
15 Wilson	
REGIONAL OFFICES	
34 60 05	
15 Scherndamm	
ANIMAL CARE	
34 60 10	
Vacant	
RESOURCE MANAGEMENT	34 60 03

BIOTECHNOLOGY, BIOLOGICALS, AND ENVIRONMENTAL PROTECTION	SES Midley 34 04
15 Lohry	
BIOLOGY, COORDINATION AND CHEMICAL ANALYSIS	
34 04 10	
15 Epprecht	
VETERINARY SERVICES	
34 04 20	
14 Randall	
BIOLOGICALS	
34 04 25	
14 Foulden	
BIOLOGY, PERMITS	
34 04 30	
15 (Werner)	
ENVIRONMENTAL DOCUMENTATION	34 04 40

SCIENCE AND TECHNOLOGY	SES Crayton 34 15
15 Boyd	
SES Nearing	
NATIONAL VETERINARY LABORATORIES	
34 15 08	
15 Redinger	
DEVELOPMENT RESEARCH CENTER	
34 15 10	
15 Leppla	
PLANT METHODS DEVELOPMENT	
34 15 15	
14 Ford	
NATIONAL MONITORING AND RESIDUE ANALYSIS	
34 15 20	

LEGISLATIVE AND PUBLIC AFFAIRS	15, Duncan 34 07
14 Baggott	
PUBLIC INFORMATION	
34 07 10	
14 Quarles	
EXECUTIVE CORRESPONDENCE	
34 07 20	
14 Poore	
LEGISLATIVE SERVICES	
34 07 30	
14 Adams	
MEDIA SERVICES	
34 07 40	

RECRUITMENT AND DEVELOPMENT	15, York 34 05
14 Blackburn	
CAREER SYSTEMS AND DEVELOPMENT	
34 05 05	
14 Elsbree	
MANAGEMENT TRAINING AND DEVELOPMENT	
34 05 10	
14 Thaw	
PROFESSIONAL DEVELOPMENT	
34 05 15	
14 Ahi	
PROFESSIONAL DEVELOPMENT COORDINATION	
34 05 20	

POLICY AND PROGRAM DEVELOPMENT	SES Hersh 34 03
SES DWIGG	
15 Thomas	
PLANNING AND INFORMATION	
34 03 05	
15 Shea	
POLICY ANALYSIS AND DEVELOPMENT	
34 03 10	
15 Wright	
REGULATORY ANALYSIS AND DEVELOPMENT	
34 03 15	
15 Shannon	
PLANT PROTECTION MANAGEMENT SYSTEMS	
34 03 20	
15 Combs	
ANIMAL HEALTH AND DEPRECIATION MANAGEMENT SYSTEMS	
34 03 25	

MANAGEMENT AND BUDGET	SES Burbanck 34 10
SES LADD	
15 (Hobbs)	
INFORMATION SYSTEMS AND COMMUNICATIONS	
34 10 03	
15 Volmerhausen	
RESOURCE MANAGEMENT SYSTEMS	
34 10 05	
15 Gradick	
FIELD SERVICING OFFICE	
34 10 25	
14 Grandy	
EQUAL OPPORTUNITY AND CIVIL RIGHTS	
34 10 07	
14 Ruttin	
EQUAL EMPLOYMENT OPPORTUNITY AND CIVIL RIGHTS	
34 10 04	

The mission of the Animal and Plant Health Inspection Service is to promote the health and well being of the peoples of the United States and its export customers through the administration of Federal laws and regulations in cooperation with State governments, pertaining to animal and plant health and quarantine, humane treatment of animals, the control and eradication of pests and diseases, and animal damage control.

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
OFFICE OF THE ADMINISTRATOR - 34 01

Assignment of Functions

1. The Administrator of APHIS, under the direction of the Assistant Secretary for Marketing and Inspection Services, formulates, directs, and supervises the execution of APHIS policies, programs, and activities. (7 CFR 2.7).

2. The Administrator is authorized to take any action, execute any document, authorize any expenditure, promulgate any rule, regulation order, or instruction required by or authorized by law and deemed by him to be necessary and proper to the discharge of the functions assigned to APHIS. (7 CFR 2.7).

3. The Administrator delegates, and provides for redelegation of authority, to appropriate officers and employees consistent with, and with due regard to, the continuing responsibility for the proper discharge of delegations made to him. (7 CFR 2.7 and 371.2).

4. The Administrator is responsible for the administration of regulatory and control activities required by the following acts: 7 CFR 2.51, and 371.2, (c), (d) and (e) .

a. Sec. 102, Organic Act of September 21, 1944, as amended and the Act of April 6, 1937, as amended (7 USC 147a, 148, 148-a-148e), relating to control and eradication of plant pests and diseases;

b. The Mexican Border Act, as amended (7 USC 149);

c. The Golden Nematode Act (7 USC 150-150g);

d. The Federal Plant Pest Act, as amended (7 USC 150aa-150jj);

e. The Plant Quarantine Act, as amended (7 USC 151-164a, 167);

f. The Terminal Inspection Act, as amended (7 USC 166);

g. The Honeybee Act, as amended (7 USC 281-282);

h. The Federal Noxious Weed Act of 1974 (7 USC 2801-2813);

i. The Endangered Species Act of 1973, as amended (16 USC 1531);

j. Executive Order 11987;

k. The responsibilities of the United States under the International Plant Protection Convention;

l. Sec. 306 of the Tariff Act of June 17, 1930, as amended (19 USC 1306);

m. Act of August 30, 1890, as amended (21 USC 1-2-105);

n. Act of May 29, 1884, as amended, Act of February 2, 1903, as amended, and Act of March 3, 1905, as amended, and supplemental legislation (21 USC 111-114a-1, 115-130);

o. Act of February 28, 1947, as amended (21 USC 114b-114c, 114d-1);

p. Act of June 16, 1948 (21 USC 114e-114f);

q. Act of September 6, 1961 (21 USC 114g-114h);

r. Act of July 2, 1962 (21 USC 134-134h);

s. Act of May 6, 1970 (21 USC 135-135b);

t. Secs. 12-14 of the Federal Meat Inspection Act, as amended, and so much of Sec. 18 of such Act as pertains to the issuance of certificates of condition of live animals intended and offered for export (21 USC 612-614, 618);

u. Improvement of poultry, poultry products and hatcheries (7 USC 429);

v. (Laboratory) Animal Welfare Act, as amended (7 USC 2131-2147, 2149-2155);

w. Horse Protection Act (15 USC 1821-1831);

x. 28 Hour Law, as amended (45 USC 71-74);

y. Export Animal Accomodation Act, as amended (46 USC 466a-466b);

z. Purebreed animal duty-free entry provision of Tariff Act of June 17, 1930, as amended (19 USC 1202, Part I, Item 100.01);

(1) Virus-Serum-Toxin Act (21 USC 151-158);

(2) Sections 203 and 205 of the Agricultural Marketing Act of 1946, as amended, with respect to voluntary inspection and certification of inedible animal by-products and inspection, testing, treatment and certification of animals and a program to investigate and develop solutions to the programs resulting from the use of sulfonamides in swine (7 USC 1622, 1624);

(3) Section 101(d) of the Organic Act of September 21, 1944 (7 USC 430);

(4) The Swine Health Protection Act, as amended Pub. L. 96-468, 94 Stat. 2229 (7 USC 3901-3912) .

- (5) Lacey Act Amendments of 1981 (16 USC 3401-3408);
- (6) Title III (and Title IV to the extent that it relates to activities under Title III) of the Federal Seed Act, as amended (7 USC 1581-1611);
- (7) Section 202(a)(2) of the Foreign Service Act of 1980 (22 USC 3922(a)(2) with respect to the Foreign Service personnel system for employees of APHIS serving abroad. (EO 12363, May 21, 1982), except for representing the Department of Agriculture in interagency consultations and negotiations with other foreign affairs agencies or approval of joint regulations issued by the Department of State relating to administration of the Foreign Service.

5. The Administrator has authority to prescribe the amounts of commuted traveltime allowances and the circumstances under which such allowances may be paid to employees covered by the Act of August 18, 1950. (7 USC 2260).

6. The Administrator is responsible for conducting diagnostic and related activities necessary to prevent, detect, control or eradicate foot-and-mouth disease and other foreign animal diseases. (21 USC 113a).

7. The Administrator is responsible for providing management support services for the Federal Grain Inspection Service, the Office of Transportation, the Agricultural Cooperative Service, the Packers and Stockyards Administration, and the Agricultural Marketing Service as agreed upon by the agencies with authority to take actions required by law or regulation. As used herein, the term management support services includes budget, finance, personnel, procurement, property management, communications, paperwork management, and related administrative services.

Availability of Information.

Information concerning APHIS programs and activities may be obtained from the appropriate Deputy administrator or from the Administrator, Animal and Plant Health Inspection Service, U.S. Department of Agriculture, Washington, D.C. 20250.

Regulations.

Rules and regulations of APHIS relating to its regulatory responsibilities are continuously published in the FEDERAL REGISTER and codified in Chapter III, Title 7 and in Chapter I, Title 9 of the Code of Federal Regulations.

Historical Documents.

The Animal and Plant Health Inspection Service was created by the Secretary of Agriculture, on April 2, 1972, (37 FR 6327). Its mission was revised with the establishment of a new agency, the Food Safety and Quality Service. (42 FR 20165). For the revised mission of APHIS, see:

1. Secretary's Memorandum No. 1914, dated March 14, 1977.
2. Secretary's Memorandum No. 1914, Supplement 1, dated April 7, 1977.
3. Delegations of Authority contained in Title 7, Part 2 of the Code of Federal Regulations (7 CFR 2.51).

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
INTERNATIONAL SERVICES - 34 20

Assignment of Functions

1. Participates with the Administrator in the overall planning and formulation of international policies, programs, and activities.
2. Maintains a Foreign Service Personnel System and directs a corps of foreign service personnel carrying out APHIS activities abroad.
3. Develops and maintains systems for monitoring and reporting the presence and movement of agricultural disease and pests.
4. Develops and maintains cooperative relationships and programs with other Federal international agencies, foreign governments, international organizations (including FAO, IICA, etc.), and industry with regard to APHIS activities in foreign countries.
5. Maintains systems for observing the effects of diseases endemic in foreign countries and evaluates the impact on the agriculture industry.
6. Develops and directs programs designed to facilitate export of U.S. plants, animals, and products.

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
SCIENCE AND TECHNOLOGY - 34 15

Assignment of Functions

1. Participates with the Administrator and other Agency officials in the overall planning and formulation of all policies, programs, and activities of APHIS oriented to the Nation's agricultural and consumer protection needs.
2. Provides laboratory support, diagnostic services, methods development, and research activities in support of all APHIS programs.
3. Cooperates and coordinates with other government agencies, state agencies, and industries to assure that the technical needs of APHIS' programs are considered and met.
4. Coordinates registration of chemicals and other substances developed for use in APHIS control and eradication programs.

U. S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
VETERINARY SERVICES - 34 50

Assignment of Functions

1. Participates with the Administrator and other Agency officials in the overall planning and formulation of all policies, programs, and activities of APHIS oriented to the Nation's agricultural and consumer protection needs.
2. Plans, provides leadership, formulates and coordinates policies, and directs the administration of the national programs to protect the health of the Nation's livestock and poultry resources.
3. Provides leadership and direction in planning, developing, budgeting, staffing, and implementing field programs through the Regional Directors for all phases of domestic activities in VS.
4. Directs, coordinates, and integrates the activities of subordinate staffs that provide support in planning, coordinating, and developing animal health information systems and maintaining a Federal-State Program operation capable of responding to exotic disease outbreaks.
5. Cooperates with and provides technical assistance to state and local governments, other APHIS organizations, other Federal agencies, and colleges and universities with regard to VS programs and activities.

Administrator's Council



Agricultural
Research
Service

United States
Department of
Agriculture



R. D. Plowman
Administrator



M. E. Carter
Associate Administrator



Gary R. Evans
Deputy Administrator
National Program Staff



Waldemar Klassen
Associate Deputy Admin.
National Program Staff



Robert R. Ojlen
Associate Deputy Admin.
National Program Staff



T. J. Clark
Deputy Administrator
Administrative Management



William H. Tallent
Assistant Administrator
Office of Cooperative Interactions



Ernest L. Corley, Jr.
Director
South Atlantic Area



W. G. Chace, Jr.
Director
Pacific West Area



Floyd P. Horn
Director
Southern Plains Area



E. B. Kijpling
Director
Beltville Area



Paul A. Putnam
Director
Mid South Area



Gerald E. Carlson
Director
Midwest Area



H. L. Rohrbart
Director
North Atlantic Area



Thomas J. Army
Director
Northern Plains Area

R. G. Breeze
Director
PLADC

The Mission of the Agricultural Research Service

The U.S. food and agriculture enterprise produces and provides the food and fiber commodities and products required to meet the needs of the American people and contributes materially to the Nation's international trade.

The scientific and technological advances required by this dynamic enterprise are provided by the full U.S. food and agricultural research and development system. The system is complex, embracing public and private scientific and educational institutions. Those institutions carry out independent but cooperative and complementary research and development activities that are responsive to the needs of the complex food and agriculture enterprise. Private corporations support and conduct research and development designed to produce new commercial products and processes; State agricultural experiment stations, State extension services, and State colleges and universities undertake scientific and educational activities intended primarily to meet the needs of their individual States; and other public and private institutions perform research and development in response to the defined needs of various Federal, State, and private sponsors.

The U.S. Department of Agriculture is authorized by legislation to provide the leadership, oversight, and management necessary to assure that the Nation is provided with adequate supplies of high-quality food and fiber. In fulfilling its responsibilities, the Department supports and conducts a wide range of research, development, extension, and education activities. A major responsibility for assuring that national food and agricultural research needs are being met rests with the Department of Agriculture's research arm--the Agricultural Research Service (ARS).

THE MISSION OF THE AGRICULTURAL RESEARCH SERVICE is to plan, develop, and implement research that is designed to produce the new knowledge and technologies required to assure the continuing vitality of the Nation's food and agriculture enterprise. As a Federal research agency, ARS (1) addresses problems that are of legitimate national concern, (2) conducts research that is appropriate for the Federal Government, and (3) exploits the unique capabilities of ARS scientists and the facilities they operate--a combination that forms an integrated and coordinated national resource that is not duplicated by others in the full U.S. agricultural research and development system.

More specifically, ARS conducts research that is--

1. National in perspective in that it focuses on significant problems affecting the entire Nation or its several broad geographic areas;
2. Sufficiently long range, high risk, and of such broad scope as to require the unified planning, continuity of effort, and stable scientific environment maintained by the Federal research organization;
3. Not undertaken by other agricultural research institutions because of their narrower geographic focus or shorter term perspective; and
4. Uniquely a Federal responsibility in that it--
 - a. Is requested by Congress or the Executive Branch and requires special skills, facilities, or capabilities of ARS;
 - b. Requires a structure ready to respond to emergency situations of regional or national significance;
 - c. Is international in nature, supporting foreign policy initiatives of the U.S. Government;
 - d. Supports the development and maintenance of important national collections that are essential to scientific activities; or
 - e. Supports Federal action programs.

**RESUME OF
JO ANN DOKE SMITH**

PROFESSIONAL EXPERIENCE AND NATIONAL APPOINTMENTS

1986-88 Chairman, Cattlemen's Beef Promotion and Research Board

1985 President, National Cattlemen's Association (NCA)

1984-86 Chairman of the Board, Federal Reserve Bank
Jacksonville, Florida

1985-87 Board of Governors, Chicago Mercantile Board of Trade

1985-87 President Reagan's U.S. Advisory Committee for Trade Negotiations

1984-86 Governor's Task Force on the Future of Florida Agriculture

1982-85 Florida Department of Agriculture and Consumer Services,
Advisory Council

1982 Director, National Livestock and Meat Board

1981-84 Trustee and Governor, Livestock Merchandising Institute
Kansas City, Missouri

1979-80 Member, USDA Animal Technical Advisory Committee on Livestock
and Livestock Products (ATAC)

1979 Member, USDA Meat Pricing Task Force

1979-80 Member, USDA Foreign Animal Disease Advisory Committee

1961-68 President, Florida Cattlewomen

STATE ACTIVITIES

Director, Florida 4-H Foundation
President, Florida 4-H Foundation (1988)

University of Florida College of Veterinary Medicine Advisory
Committee

Director, Ocala-Marion County Chamber of Commerce and Chairman
of Agribusiness Committee (1988)

University of Florida, Health Science Center
Board of Oversees

COMMUNITY ACTIVITIES

- 1971-81 Chairman, Board of Trustees, Monroe Regional Medical Center,
 Ocala, Florida
- Chairman, United Way, Agriculture Division, Member of Executive Committee
- Active in the Cub Scouts, Boy Scouts, Brownies and School Booster Clubs

HONORS

- 1988 Woman of the Year in American Agriculture
 -Progressive Farmer
- 1986 Award of Merit for Distinguished Service to Agriculture
 -Gamma Sigma Delta (National Agriculture Leadership Honorary)
 Alpha Zeta
- 1986 Woman of the Year in Florida Agriculture
 -Florida Department of Agriculture and Consumer Services
- 1986 Headliner Award
 -Livestock Publications Council
- 1985 Floyd Forbes Award for Service to the Meat Industry
 -Western States Meat Associations
- 1982 Woman of the Year in Florida Agriculture
 -Progressive Farmer Magazine
- 1986 American Polled Hereford-Public Service Award of Merit

OCCUPATION

- 1958-88 Operating Partner, Secretary and Treasure, Smith
 Brothers Farming and Ranching, Wacahoota, Florida
- 1962-88 Vice President, Smith Construction Company
 Willston, Florida
 Family-owned business
- 1989-Present - Assistant Secretary, Marketing and Inspection Services,
 U.S. Department of Agriculture

PERSONAL STATISTICS

Born - Gainesville, Florida - May 9, 1939

Married - Cedrick M. Smith, Jr., Wacahoota, Florida 1957. Two
children - Marty, age 30, lawyer; Terri, age 28, Certified
Public Accountant

Graduate - Santa Fe High School, Alachua, Florida

Graduate - Florida School of Real Estate Law, Orlando, Florida

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(904) 466-3438

CHARLES E. HESS
Assistant Secretary of Agriculture
for Science and Education

CHARLES E. HESS was sworn in as Assistant Secretary for Science and Education on May 22, 1989. He is responsible for USDA research and education programs in the food and agricultural sciences, including planning, evaluation, and coordination of the State-Federal activities through various committee structures. The Agricultural Research Service, the Cooperative State Research Service, the Extension Service, and the National Agricultural Library are under his general supervision. He also serves as USDA's Co-Chair of the Joint Council on Food and Agricultural Sciences.

A native of New Jersey, Dr. Hess earned his B.S. degree in plant science from Rutgers University in 1953. He received M.S. and Ph.D. degrees in horticulture, plant physiology, and plant pathology from Cornell University in 1954 and 1957. From 1956 to 1958, he served as a first lieutenant in the U.S. Army Chemical Corps at the U.S. Army Biological Laboratories in Frederick, Maryland.

He began his career with the Department of Horticulture at Purdue University in 1958. He later became Research Professor and Chair of the Department of Horticulture and Forestry at Rutgers University in New Brunswick, New Jersey. After serving as both Associate Dean and Acting Dean of the College of Agriculture and Environmental Sciences at Rutgers, in 1972 Dr. Hess became the first Dean of Cook College at Rutgers. From 1971 to 1975, he was also Director of the New Jersey Agricultural Experiment Station.

In 1975, Dr. Hess was appointed Dean of the College of Agricultural and Environmental Sciences at the University of California at Davis and Associate Director of the California Agricultural Experiment Station. On January 1, 1988, he assumed the additional post of Director of Programs, Division of Agriculture and Natural Resources, for the California Agricultural Experiment Station and the Cooperative Extension Service.

Dr. Hess was named to Phi Beta Kappa at Rutgers, and in 1983, he received an honorary doctoral degree from Purdue. He has been honored as a fellow in the American Association for the Advancement of Science and in the American Society for Horticultural Science, and in 1988, he received a USDA Award for Distinguished Service.

From 1982-1988, he had a Presidential appointment to the National Science Board (National Science Foundation), and in 1987, Secretary Lyng appointed him as Co-Chair of the Joint Council on Food and Agricultural Sciences. He chaired the National Research Council committee to develop a National Strategy for Biotechnology in Agriculture. In addition, he has traveled extensively as an advisor and consultant on agricultural matters.

BIOGRAPHICAL SKETCH

NAME : Dr. James W. Glosser

TITLE: Administrator, APHIS

BUSINESS ADDRESS: U. S. Department of Agriculture
Animal and Plant Health Inspection Service
Room 312-E, Administration Building
P. O. Box 96464
Washington, D.C. 20090-6464

BACKGROUND DATA:

Prior to being appointed Administrator, served as the Acting Administrator, the Associate Administrator, the Acting Deputy Administrator of Veterinary Services and was the Assistant to the Administrator since joining APHIS in December 1983.

For six years, prior to joining USDA, was the Administrator of Montana's Animal Health Division. Also served as State Veterinarian, State Public Health Veterinarian, and in other capacities for the State of Montana.

He was in private veterinary practice in Miles City, Montana from 1963 to 1966 and was a veterinary epidemiologist with the U.S. Public Health Service, Centers for Disease Control in Atlanta, Georgia, from 1966 to 1973.

A native of Helena, Montana, earned my Bachelor of Science degree and Doctor of Veterinary Medicine degree at Washington State University, and a Masters of Public Health degree at the University of Minnesota.

BIOGRAPHICAL SKETCH

NAME : R. Dean Plowman

TITLE: Administrator, ARS

BUSINESS ADDRESS: U. S. Department of Agriculture
Agricultural Research Service
Room 302-A, Administration Building
Washington, D.C. 20250

BACKGROUND DATA:

Appointed as Administrator of the Agricultural Research Service by Secretary Lyng on April 15, 1988. Following his military service in the U.S. Army during World War II, he earned his Bachelor of Science Degree in Dairy Science from Utah State Agriculture College, his Masters Degree in Animal Husbandry and his Ph.D in Animal Genetics from the University of Minnesota.

From 1956 to 1984, he had ARS positions of increasing responsibility. He headed a group of scientists in planning, organizing, and conducting long-term studies on basic genetics, the application of advanced genetic concepts and principles to the improvement of dairy cattle, and studies of management factors which affect production characteristics.

He was the Director of the ARS Animal Genetics Improvement Laboratory, which was instrumental in the development of the current USDA sire summary procedures and in getting this method adopted by all segments of the dairy industry.

He was appointed Area director and managed research programs in the states of Idaho, Utah, Nevada, Arizona, New Mexico, Colorado and Wyoming. In 1984 he assumed the position of Head of the Department of Animal, Dairy and Veterinary Sciences at Utah State University at Logan.

BIOGRAPHICAL SKETCH

Name: Roger G. Breeze

Business Address: USDA-ARS-NAA
Plum Island Animal Disease Center
P. O. Box 848
Greenport, NY 11944

Telephone Number (Work): (516-323-2500, Ext. 202)

Education:

High School	1958-64	The Manchester Grammar School, Manchester, England
Bachelor Veterinary Medicine and Surgery	1968	University of Glasgow, Glasgow, Scotland
Doctor of Philosophy (Veterinary Pathology)	1973	University of Glasgow, Glasgow, Scotland

Professional Experience:

Born and raised on a small mixed farm in the north of England still operated by my family, I have a broad practical experience of dairy operations (including bottling and direct retailing of milk), beef, swine and poultry. In various positions in the US and Britain, I have had extensive day-to-day contact with animal commodity producers from farm to consumer.

1987 - to present: Center Director
US Department of Agriculture
Agricultural Research Service
Plum Island Animal Disease Center

The mission of the Center is to protect US animal agricultural commodities from potentially devastating epidemic diseases that do not occur in the United States.

1984 - 1987: Chairman
Department of Veterinary Microbiology
and Pathology
College of Veterinary Medicine
Washington State University
Pullman, WA 99164

Associate Director
Washington Technology Center
University of Washington
Seattle, WA 98195

As Chairman, I was responsible for teaching, research and public service missions of the department, which was part of the Washington-Oregon-Idaho regional program in veterinary medicine.

As Associate Director, I was responsible for administration of Washington's statewide high technology state/industry/university research programs in: Advanced Materials, Compound Semiconductors, Computer Systems and Software, Manufacturing Systems, Medical Biotechnology, Microsensors, Plant/Forest Product Biotechnology.

1982 - 1984: Associate Dean for Research
College of Veterinary Medicine
Washington State University (and Associate Director,
Agricultural Experiment Station)

Responsible for development of college research programs and main contact for animal commodity interests.

1977 - 1987: Associate Professor and Professor (1982-87)
Department of Microbiology and Pathology
College of Veterinary Medicine
Washington State University

Involved in typical teaching, research and service duties as a veterinary pathologist. Research interests - cardiopulmonary diseases of animals and man (acute bovine pulmonary emphysema, shipping fever, chronic obstructive pulmonary disease), infectious diseases, new technology vaccines. Over 150 scientific publications in these areas.

1968 - 1977: Lecturer, Department of Veterinary Pathology,
University of Gasgow, Scotland

Similar to work at Washington State University.

BIOGRAPHICAL SKETCH

Name: Douglas M. Moore

Business Address: USDA-ARS-NAA
Plum Island Animal Disease Center
P. O. Box 848
Greenport, NY 11944

Telephone Number (Work): (516-323-2500, Ext. 306)

Education:

BS Agriculture	1967	University of Delaware Newark, DE
PhD Microbiology	1972	Johns Hopkins University School of Medicine, Department of Microbiology, Baltimore, MD
NIH Postdoctoral Fellow	1972	Johns Hopkins University School of Medicine, Department of Microbiology, Baltimore, MD
Postdoctoral Research Associateship	1973	National Science Foundation Plum Island Animal Disease Center Greenport, NY

Professional Experience:

1984 - to present:	Research Leader, Molecular Biology Laboratory, US Department of Agriculture, Agricultural Research Service, Plum Island Animal Disease Center
1981 - 1987:	Principal Investigator, PIADC/Genentech FMDV Gene Cloning/Biosynthetic Vaccine Project
1979 - 1981:	Assistant Adjunct Professor, Department of Health Science, C. W. Post Center, Long Island University, Greenvale, NY
1973 - 1984:	GS-12/GS-14 Microbiologist, Immunology Laboratory, PIADC
1972 - 1973:	GS-11, Microbiologist, Postdoctoral Research Associate, PIADC
1967 - 1972:	Pre- and Postdoctoral fellow, Johns Hopkins University, School of Medicine, Baltimore, MD
1965 - 1966:	Research Assistant, Department of Plant Pathology, University of Delaware, Newark, DE

Professional Societies:

American Association for the Advancement of Science
American Society for Microbiology
American Society for Virology
Congress of Research Workers in Animal Diseases

Awards:

NIH Predoctoral Fellowship	1967-1972
NIH Postdoctoral Fellowship	1972
AAAS Newcomb-Cleveland Prize	1982
Distinguished Service Award, USDA	1982

BIOGRAPHICAL SKETCH

Name: William W. Laegreid

Business Address: USDA-ARS-NAA
Plum Island Animal Disease Center
P. O. Box 848
Greenport, NY 11944

Telephone Number (Work): (516-323-2500, Ext. 313)

Education:

BS	1980	Department of Zoology Washington State University
MS	1984	College of Veterinary Medicine Washington State University
DVM	1985	College of Veterinary Medicine Washington State University
PhD	1988	College of Veterinary Medicine Washington State University

Professional Experience:

1989 - to present: Head, Molecular Pathology
US Department of Agriculture
Agricultural Research Service
Plum Island Animal Disease Center

1985 - 1988: Resident in Pathology, Washington Animal Disease Diagnostic
Laboratory, Washington State University, Pullman, WA

1980 - 1985: Graduate Student, Veterinary Student, and Research
Technician I, Department of Veterinary Microbiology and
Pathology, College of Veterinary Medicine, Washington
State University, Pullman, WA

1974 - 1976: Technician, Biology Department, Battelle Pacific NW Labs,
Richland, WA

Research Interests:

My primary interest is the pathogenesis of disease at the subcellular and biochemical level, primarily in the lung. I have been working on the mechanisms of virus-induced defects in host mucosal defenses and inflammatory processes with H. D. Liggitt at Genentech and R. W. Leid at Washington State.

I expect to develop a new group studying mechanisms of cell injury in African swine fever, foot-and-mouth disease and other exotic animal diseases.

BIOGRAPHICAL SKETCH

Name: Daniel L. Rock

Business Address: USDA-ARS-NAA
Plum Island Animal Disease Center
P. O. Box 848
Greenport, NY 11944

Telephone Number (Work): (516-323-2500)

Education:

BSE	1974	Drake University Des Moines, IA
PhD - Veterinary Microbiology	1981	Iowa State University Ames, IA

Professional Experience:

1989 - to present: Research Leader, Microbiology
US Department of Agriculture
Agricultural Research Service
Plum Island Animal Disease Center

I will be leading the Center's program in African swine fever.

1987 - 1989:	Associate Professor Department of Veterinary Science University of Nebraska-Lincoln
1984 - 1987:	Assistant Professor Department of Veterinary Science North Dakota State University
1983 - 1984:	Temporary Assistant Professor Veterinary Medical Research Institute College of Veterinary Medicine Iowa State University
1981 - 1983:	Postdoctoral Fellow (Public Health Service - National Research Service Award) Department of Microbiology, College of Medicine University of Pennsylvania/Wistar Institute
1977 - 1981:	Graduate Research Assistant Veterinary Medical Research Institute Iowa State University

1975 - 1976: Graduate Teaching Assistant
 Department of Psychology
 Drake University

My general interests are in viral pathogenesis, particularly in the molecular mechanisms involved in establishment and maintenance of persistent viral infections and the role these infections may play in chronic and slow diseases of animals and man.

My most recent research effort (1983-1989) focuses on latent bovine herpesvirus type 1 (BHV-1) infection. Work centers on understanding in molecular terms how the latent infection is initiated, maintained and reactivated. Facets of this project include: precise localization of the viral genome in latently infected animals; characterization of the physical state of the latent BHV-1 genome, including an assessment of the degree of methylation and nuclease sensitivity; characterization and mapping of BHV-1 gene transcription during the latent phase of the infection and during dexamethasone induced reactivation; and identification and characterization of viral proteins present in latently infected cells. In addition, I am collaborating on similar studies involving bovine herpesvirus type 4 and pseudorabies virus.

Professional and Honorary Societies:

Phi Kappa Phi
Kappa Delta Phi
American Society for Microbiology
American Association for the Advancement of Science
Conference of Research Workers in Animal Diseases

NAME: FRED BROWN

DATE OF BIRTH: 31st January 1925

EDUCATION
AND DEGREES:

Burnley Grammar School
School Captain
Captain of Cricket and Football 1st XIs

Manchester University

1944 - B.Sc. 1st Class Honours in Chemistry
Shared Woodiwis Prize awarded on results of
Part 1 of final examination.

1946 - M.Sc. Thesis entitled "New methods for end-
group determination in starches".

1948 - Ph.D. Thesis entitled "Investigations into
the chemical constitution and structure of
some complex plant polysaccharides".

1981 - Elected Fellow of the Royal Society

1986 - Elected Fellow of the Institute of Biology

APPOINTMENTS:

1946 - 1948: Assistant lecturer in Chemistry, University of
Manchester.

1948 - 1950: Lecturer and Research Chemist, Bristol University,
Fruit and Vegetable Preservation Research Station.

1950 - 1953: Senior Scientific Officer, Hannah Dairy Research
Institute, Ayr.

1953 - 1955: Senior Research Assistant, Christie Hospital,
Manchester.

1955 - 1983: Department of Biochemistry, Animal Virus Research
Institute, Pirbright.

Appointed as Senior Scientific Officer, promoted to
Principal Scientific Officer in April 1958

Appointed Head of Biochemistry Department in July
1964 and promoted to Senior Principal Scientific
Officer.

Promoted to Deputy Chief Scientific Officer, July
1971

Appointed Deputy Director, 1980

1983 - date: Head of Virology Research and Development,
Wellcome Biotechnology, Beckenham

EDITORIAL APPOINTMENTS:

1970 - 1985:	Member of Editorial Board, Journal of General Virology.
1974 - 1975:	Editor, Journal of General Virology
1975 - 1980:	Editor-in-Chief, Journal of General Virology
1975 - 1981:	Editor, Comparative Virology section of Intervirology
1981 - date:	Editor of FEMS Microbiology Letters
1982 - date:	Member of Editorial Board, Journal of Virological Methods
1984 - date:	Member of Editorial Board, Virus Research
1984 - 1988:	Editor of the Journal of Experimental Pathology
1984	Editor of Principles of Bacteriology, Virology and Immunity. Vol. IV, Virology (with G.S. Wilson). 7th Edition.

ADVISORY POSITIONS:

1968 - 1981:	Member of Rhabdovirus Study Group, International Committee for Taxonomy of Viruses (I.C.T.V.); Chairman 1975 - 1981.
1971 - 1981:	Member of Picornavirus Study Group, I.C.T.V.
1971 - date:	Member of Advisory Board, Unit of Invertebrate Virology, Natural Environment Research Council, Oxford
1972 - 1975:	Convenor, Virus Group, Society for General Microbiology
1975 - 1981:	Vice-Chairman, Vertebrate Virus Sub-Committee, I.C.T.V.
1977 - 1987:	Member of Agricultural Research Council Committee on Scrapie.
1978	World Health Organization Consultant to review work of Virology Division, Center for Disease Control, Atlanta, Georgia, U.S.A.
1979 - date:	Chairman, WHO/FAO Programme on Comparative Virology
1981 - 1987:	President, I.C.T.V.
1982 - date:	Member of Executive Committee, International Union of Microbiological Societies (I.U.M.S.) Vice President 1986 -

- 1983 - 1987: Chairman, Biological Education Committee, Royal Society
- 1984 - 1988: Member of Cell and Disorders Board, Medical Research Council.
- 1984 - date: Member of the Scientific Advisory Group of Experts, Vaccine Research Programme, World Health Organization
- 1985 - date: Member of Board and of the Scientific Advisory Policy Committee, National Institute of Biological Standards and Control
- 1986 - date: Judge on Panel for Prince of Wales' Award for Innovation to Industry.
- 1988 - date: Vice-President, Institute of Biology

NAMED LECTURES:

- 1976 Visiting Lecturer: Australian Society for Microbiology
- 1983 Charnock-Bradley Lecture: University of Edinburgh
- 1984 Wilmott Guest Lecture: University of Bristol
- 1986 Jenner Lecture: Jenner Trust
- 1986 Dale Lecture: National Institute of Biological Standards and Control
- 1986 Royal Society Review Lecture

RESEARCH ACTIVITIES

My work in virology has been influenced greatly by spending most of my career at the Animal Virus Research Institute, an environment where the study of exotic virus diseases is of paramount importance. Inevitably, emphasis has been placed on the study of viruses of economic importance but the aim has been to try to provide fundamental information on these viruses. Latterly, since moving to Wellcome in 1983, my work has focused on an analysis of the structural basis for effective immunisation.

I have published over 280 scientific articles dealing mostly with the biochemistry, biology and pathogenesis of important animal viruses.

BIOGRAPHICAL SKETCH

NAME : Lonnie J. King

TITLE: Deputy Administrator, Veterinary Services

BUSINESS ADDRESS: U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Room 320-E, Administration Building
Washington, D.C. 20250

BACKGROUND DATA:

Prior to being appointed as Deputy Administrator, Veterinary Services, APHIS, USDA, he served in Washington, D.C. as Director of the Governmental Relations Division for the American Veterinary Medical Association. He has extensive contacts with a large segment of the veterinary profession through his work with other governmental agencies, universities, major livestock and poultry industry groups, and private practitioners. He maintains a high level of interest in public veterinary medicine through his experience and program initiatives.

He was engaged in private veterinary practice for 7 years in Dayton, Ohio, and Atlanta, Georgia. He served in a variety of positions in APHIS-VS from 1977-1987. Those positions included field veterinary medical officer (Georgia) and station epidemiologist (Texas). He spent 5 years in Hyattsville, Maryland, in staff assignments both in Emergency Programs and Animal Health Information. During this time, he directed the development of the Agency's National Animal Health Monitoring System.

He is a native of Wooster, Ohio, received his BS (1966) and DVM (1970) degrees from the Ohio State University. He also earned his MS degree in epidemiology from the University of Minnesota while on a special USDA assignment in 1980. He is a diplomate of the American College of Veterinary Preventive Medicine and has recently completed the Senior Executive Fellowship program at Harvard University.

BIOGRAPHICAL SKETCH

NAME: Alfred Strating

TITLE: Director, Science and Technology

BUSINESS ADDRESS: USDA/APHIS/S&T
P.O. Box 96464
Room 1630 South
Washington, DC 20090-6464

CURRENT DUTIES: Responsible for the overall planning, coordinating, and directing of national programs of laboratory support, research, and methods development and providing expert advice and data in formulating broad policies and planning overall APHIS and Department regulatory, control, and eradication programs as they relate to activities under his direction.

BACKGROUND DATA: Dr. Strating received a Bachelor of Science degree and Doctor of Veterinary Medicine degree (1965) from the University of Minnesota and earned a Master of Science degree from Colorado State University in 1970. He began his APHIS career in 1967 as a Biologics Program Field VMO at the National Veterinary Services Laboratories in Ames, Iowa, and transferred in this same position to Fort Collins, Colorado in 1968. He returned to Ames in 1970, where he held positions as Section Head, Laboratory Chief, and Associate Director, and in 1982 he became Director of NVSL. In 1983, Dr. Strating was transferred to Reno, Nevada, as Regional Director of the Veterinary Services Western Regional Office with responsibility for an eight-state region which included Alaska and Hawaii. When the Western Regional Office was closed in 1985, he was transferred to the Central Regional Office in Fort Worth, Texas, with responsibility for a ten-state region which also included the Veterinary Biologics Field Office in Ames, Iowa. In December 1987, Dr. Strating was detailed to the APHIS Administrator's task force to identify critical needs and develop a plan for reorganizing APHIS and subsequently was named Director of the Science and Technology Division. Dr. Strating is professionally associated with the American Veterinary Medical Association (AVMA), the U.S. Animal Health Association (USAHA), the Livestock Conservation Institute (LCI), and the American Association of Veterinary Laboratory Diagnosticians (AAVLD).

BIOGRAPHICAL SKETCH

NAME : Alejandro (Alex) Thiermann
TITLE: Deputy Administrator
International Services
Animal and Plant Health Inspection Service

BUSINESS ADDRESS: USDA/APHIS/IS
Room 324-E
P.O. Box 96464
Washington, D.C. 20090-6464

CURRENT DUTIES: Deputy Administrator, International Services,
Animal and Plant Health Inspection Service
(APHIS), USDA

BACKGROUND DATA:

Alex Thiermann recently joined APHIS after serving for two years as the Program Leader for Animal Health at the Agricultural Research Service (ARS), USDA. He began his career in ARS in 1979 as Research Leader of the Leptospirosis Research Laboratory at the National Animal Disease Center, Ames, Iowa. Later, he also became Research Leader of the Mycobacteriosis Research Laboratory.

He has authored more than 40 scientific publications and several reviews and book chapters dealing with leptospirosis, paratuberculosis, molecular biology, and remote sensing. Currently, he serves on several committees dealing with animal diseases and biotechnology for the USDA, U.S. Animal Health Association, Conference of Research Workers in Animal Diseases, and the American Leptospirosis Research Conference.

He has served in advisory capacities and as consultant in animal diseases to various national committees and several Latin American countries. He has had over 30 special invitations to lecture in the United States, Latin America, and Europe. He is the recipient of the ARS Fellowship Award (1986) and served as visiting scientist at the Veterinary Research Laboratory, Ministry of Agriculture, Northern Ireland.

He is a member of the American Veterinary Medical Association, American Society for Microbiology, Sigma Xi, American Association of Laboratory Animal Diagnosticians, Phi Zeta, Wildlife Disease Association, American Association of Wildlife Veterinarians, and American Association for Advancement of Science.

Dr. Thiermann received his D.V.M. degree from the University of Chile at Santiago, and a Ph.D. degree in microbiology and immunology from the School of Medicine, Wayne State University, Detroit, Michigan.

BIOGRAPHICAL SKETCH

NAME: PHYLLIS MULLENAX YORK

TITLE: Director, Recruitment and Development

BUSINESS ADDRESS: 6505 Belcrest Road
Room 238 Federal Building
Hyattsville, Maryland 20782

CURRENT DUTIES: As Director of Recruitment and Development, provides leadership to recruit, help develop, and maintain a diversified and competent work force for APHIS.

BACKGROUND DATA: Dr. York earned a Bachelor of Science degree from Colorado State University in 1954 and a D.V.M. from the same institution in 1956. In 1975 she earned a Master's degree in Educational Administration and Curriculum Development from University of Alabama in 1975 and a Ph.D. in Educational Administration from Bowling Green State University, awarded in 1982.

After graduating with a D.V.M., Dr. York spent the next 13 years in the fields of public secondary and post secondary education as a science teacher and science department coordinator, as a clinical pathology instructor in the Central University of Quito, Ecuador, as an assistant to the Veterinary Pathology chairperson at Iowa State University, and in private large and small animal veterinary practice. Between 1971 and 1980, Dr. York was the Superintendent of American-sponsored overseas schools in Cali and Bogota, Colombia. She was a consultant employed to evaluate development projects in secondary and post-secondary education for the rural areas of Colombia. Dr. York joined APHIS in Hyattsville, Maryland, in 1983 as Chief Staff Veterinarian for curriculum development for nearly 3 years and later served as Assistant Director, Education and Career Development Branch, Resource Management Staff, Veterinary Services (VS), responsible for the professional and technical training of VS employees. In October 1987 she was named Acting Director, Resource Management Staff, which position she held for a year, during part of which time she was concurrently serving as Director of the new Recruitment and Development activities of APHIS.

Dr. York is an active member of the American Veterinary Medical Association, U.S. Animal Health Association, Association of Teachers of Veterinary Public Health and Preventative Medicine, American Educational Research Association.

BIOGRAPHICAL SKETCH

NAME: John A. Acree, DVM, MVPM

TITLE: Senior Staff Officer

BUSINESS ADDRESS: AHDS-PPD-APHIS-USDA
Room 802, Federal Bldg.
6505 Belcrest Road
Hyattsville, MD 20782

CURRENT DUTIES:

Dr. Acree supervises a team of animal health professionals, including wildlife biologists and veterinarians, which performs risk assessments and emergency planning. He directs the team in developing the methodologies and applying them to issues presented by clients in Veterinary Services and Animal Damage Control. Most recently, the team has been concentrating its efforts on expanding APHIS' plan for FMD.

BACKGROUND DATA:

Dr. Acree received his DVM degree from Colorado State University in 1959. He obtained the Master of Preventive Veterinary Medicine (MPVM) degree from the University of California at Davis in 1968. His professional interests include: the epidemiology of vector-borne animal diseases, the planned response to emergency livestock threats and the use of embryo transfer in preventive veterinary medicine.

Most of Dr. Acree's professional career has been with the USDA, both with APHIS and ARS. He has been trained in foreign animal disease diagnosis, and has applied this knowledge in hog cholera eradication, FMD exclusion, and quarantine facility supervision. He has been involved in planning animal health programs for APHIS since 1981. His position with AHDS, a result of the APHIS reorganization, provides the challenge of leading APHIS into new applications of risk assessment and emergency planning.

BIOGRAPHICAL SKETCH

NAME: Sean F. Altekruse

TITLE: Staff Veterinarian

BUSINESS ADDRESS: Room 745, Federal Building, 6505 Belcrest Road,
Hyattsville, Maryland 20782

CURRENT DUTIES: Involved in Veterinary Services' activities relating to the epidemiology of Salmonella enteritidis (SE) in poultry. Evaluate data and information on SE from field investigations, industry, research, and other Agencies of Government to advance APHIS program on food safety issues relating to SE in poultry. Participate in development of regulations concerning SE quality assurance in the poultry industry.

BACKGROUND DATA: APHIS Staff Officer Training Course, 1990
APHIS Public Veterinary Practice Career Program, 1989
Masters of Public Health, University of South Carolina,
1988
Graduate of the University of Georgia, College of
Veterinary Medicine, 1987

BIOGRAPHICAL SKETCH

NAME: M. J. GILSDORF

TITLE: SENIOR STAFF EPIDEMIOLOGIST

Business address: USDA, APHIS, IS
Federal Building Rm 662
Hyattsville, MD 20782

CURRENT DUTIES: 1. Evaluates programs and activities concerning the origin, history, epidemiology, control and eradication of animal diseases.

2. Assists in the development of specific plans and provides epidemiological analyses for International Services animal disease and pest programs for livestock or related industries of the United States.

3. Collects, reviews and analyzes information on history and/or status of exotic and domestic animal and plant diseases and pests.

4. Assesses risk and/or predicts trends in occurrence of disease or pest outbreaks to facilitate the decision makers in assessing and dealing with potential threats to the United States livestock or plant industry.

5. Maintains contact with disease control and eradication officials, etc.

6. Maintains liason with Veterinary Services emergency programs staff.

7. Serves as a resource on current animal disease information for APHIS-IS personnel.

8. Represents APHIS and/or IS at meetings or training concerning animal disease and pests.

BACKGROUND DATA:

Veterinary Medical Officer USDA-APHIS, Vet. Serv. Manhattan, KS - 7/74 to 8/77

Head of Brucellosis vacc. proj., Nat'l Vet. Serv. Lab., Ames, Iowa 9/77 to 8/78

Head of Animal Resources Sec., Nat'l Vet. Serv. Lab, Ames, Iowa, 8/78 to 4/82
Ass't Area Vet. in Charge (AVIC), USDA-APHIS, Vet. Serv., Topeka, KS, 4/82 to 7/84

Staff Vet. for Import Products - USDA-APHIS, V.S., Hyattsville, MD, 7/84 to 10/85

Senior Staff Vet for Cattle Disease - USDA-APHIS, VS, Hyattsville, MD, 10/85 to 4/86

Senior Staff Vet for Export Animal USDA-APHIS, VS, Hyattsville, Md, 4/86 to 1/89

Senior Staff Epidemiologist USDA-APHIS, VS Hyattsville, MD 1/89 to present.

BIOGRAPHICAL SKETCH

NAME: David E. Herrick

TITLE: Chief Staff Veterinarian
Import-Export Animals Staff
Veterinary Services

BUSINESS ADDRESS: Room 764, Federal Building
6505 Belcrest Road
Hyattsville, MD 20782

CURRENT DUTIES: Supervises the operation of the Import-Export Animals Staff which issues special import permits, develops regulations, and health certificates for import and export of animals, animal semen, embryos, and avian species. Maintains liaison with other Government agencies, industry representatives, and foreign government counterparts. Represents the Department as an expert in the field of import and export of animals at meetings. Is responsible for recommending policy to the Administrator for the import and export of animals and avian species.

BACKGROUND DATA: Native of Kansas; Dr. Herrick graduated from Kansas State University in 1951. He maintained a mixed practice of veterinary medicine north of Topeka, Kansas, until 1960. Dr. Herrick was employed by the Department's Animal Inspection and Quarantine Division as port veterinarian for four eastern Montana livestock ports of entry for 5 years. In 1965, Dr. Herrick was accepted into the 12th Veterinary Administrator's Development Program, completing it in 1966. He was a Supervisory Area Veterinarian for 3 months in Tulsa, Oklahoma, before being appointed Assistant Veterinarian in Charge of the Maryland Office for Veterinary Services. In 1968 he became Assistant to the Senior Staff Veterinarian in the Import-Export Animals and Products Staff, Staff Veterinarian for Import Animals, Chief Staff Veterinarian for Import Animals in 1972, and in 1980 Senior Staff Veterinarian. He was named Chief Staff Veterinarian of the Import-Export Operations Staff following Veterinary Service's reorganization in 1986 and currently holds the same position in the Import-Export Animals Staff.

BIOGRAPHICAL SKETCH

NAME: Harvey A. Kryder, Jr.

TITLE: Senior Staff Veterinarian
Import-Export Products Staff

BUSINESS ADDRESS: USDA, APHIS, Veterinary Services
6505 Belcrest Road
Room 758, Federal Building
Hyattsville, MD 20782

CURRENT DUTIES: Serves as the Senior Staff Veterinarian in the Organisms and Vectors Section, Import-Export Products Staff, Operational Support, Veterinary Services (VS), Animal and Plant Health Inspection Service. He has responsibility for planning, coordinating, analyzing, and monitoring activities involved in the import, transport, and use of pathogenic organisms and vectors. Represents VS in establishing and maintaining liaison with research workers in federal and nonfederal agencies, the scientific community, foreign countries, and the industrial sector to evaluate risks and develop procedures for the safe importation and handling of organisms, vectors, animals, and animal products.

BACKGROUND DATA: Dr. Kryder received his V.M.D. from the University of Pennsylvania in 1960, and he served in the U.S. Air Force Veterinary Corps from 1960-1964. Dr. Kryder joined the U.S. Department of Agriculture in 1965. His first assignment was in Alabama as a field veterinarian in the brucellosis eradication program. In 1967, he was assigned to Massachusetts while attending graduate school at the Massachusetts Institute of Technology. In 1968, he was transferred to the Maryland field station before being assigned to headquarters in Hyattsville in 1969. Dr. Kryder served in various staff positions in Hyattsville. In 1980, he was appointed Chief Staff Veterinarian, Organisms and Vectors, Import-Export Products Staff.

NAME: Harless A. McDaniel

TITLE: Assistant to the Deputy Administrator

BUSINESS ADDRESS: Room 807, Federal Center Building
Hyattsville, MD
Phone: 301-436-5952

CURRENT DUTIES:

1. Reviewing foreign animal disease policies and concepts and developing recommendations for the Administrator to strengthen emergency preparedness and responsiveness.
2. Representing VS, APHIS at meeting with industry officials and other agencies.
3. Developing recommendations for solutions to sensitive problems such as animal identification and residues.

BACKGROUND DATA:

Education: DVM Auburn 1956
PhD (Pathology) Iowa State University 1966

Work Experience: Chief of pathology and toxicology NVSL 1966-73
Principal Staff Officer for Laboratory Support, Emergency Programs 1973-79
Chief of technical support staff 1979-86
During 79, 80, and 81, 25% of the time was devoted to planning the African Swine Fever eradication program for the Caribbean Region.
Assistant Director Program Planning and Development 1986-88

BIOGRAPHICAL SKETCH

NAME: Charles A. Mebus

TITLE: Laboratory Chief

BUSINESS ADDRESS: USDA, APHIS, S&T, NVSL, FADDL
P. O. Box 848
Greenport, NY 11944

CURRENT DUTIES: Dr. Mebus is responsible for managing the activities and personnel of the Foreign Animal Disease Diagnostic Laboratory (FADDL) within established budgetary and staffing limitations. He provides scientific leadership in the guidance of a multidiscipline laboratory program for the diagnosis of foreign animal diseases. He takes part in foreign animal disease training schools and also in bench training for foreign and domestic veterinarians and technicians in the proper conduct of diagnostic laboratory techniques.

BACKGROUND DATA: DVM obtained at Cornell University in 1956; PhD obtained at Kansas State University in 1963; Diplomat American College of Veterinary Pathologists, Associate Professor at College of Veterinary Medicine, Kansas State University, 1963-1965; Professor, College of Agriculture, University of Nebraska, 1965-1977; Research Leader, USDA, ARS, PIADC, Greenport, NY, 1977-1988; Laboratory Chief, USDA, APHIS, S&T, NVSL, FADDL, Greenport, NY, 1988-present.

BIOGRAPHICAL SKETCH

NAME: M. A. Mixson

TITLE: Chief Staff Veterinarian, Emergency Programs, Veterinary Services, Animal and Plant Health Inspection Service, U.S. Department of Agriculture

BUSINESS ADDRESS: Room 747, Federal Building, 6505 Belcrest Road, Hyattsville, Maryland 20782

CURRENT DUTIES: Responsible for formulating, organizing, and executing organizational capabilities and directing field operations for handling problems involving diseases and pests of foreign origin which affect livestock and poultry. Responsible for establishing and maintaining National surveillance over animal and bird populations to detect the entrance of foreign diseases, as well as maintaining current data pertaining to foreign diseases and information on the distribution of livestock, poultry, and associated industries for surveillance and epidemiological activities. Provides training procedures pertaining to foreign diseases and maintains trained personnel to effectively respond to National disease emergencies. This includes epidemiological and diagnostic investigative functions, appraisal, depopulation, vaccination, cleaning and disinfection, vector control, disease prevention, and other activities.

BACKGROUND DATA: Chief, Emergency Programs, June 1987 to present
Area Veterinarian in Charge, Alabama, 1979-1987
Chief, National Emergency Field Operations, 1976-1979
Principal Staff Officer, Foreign Animal Disease Surveillance, 1973-1976
Staff Veterinarian, Emergency Diseases, 1972-1973
Area Veterinarian in Charge, Maryland, 1971-1972
Assistant Area Veterinarian in Charge, Minnesota, 1970-1971
Assistant Area Veterinarian in Charge, Maryland, 1968-1970
Foot-and-Mouth Disease Eradication, Great Britain; Veterinary Administrator Development Program, 1967-1968
District Veterinarian, Birmingham and Montgomery, Alabama, 1963-1968
Participated in various capacities in the Successful Eradication of Hog Cholera, Exotic Newcastle, Venezuelan Equine Encephalomyelitis, and Contagious Equine Metritis from the United States

BIOGRAPHICAL SKETCH

NAME: Samuel S. Richeson

TITLE: Senior Staff Veterinarian
USDA, APHIS, Veterinary Services
Import Animal Staff

BUSINESS ADDRESS: USDA, APHIS, VS
IMPORT-EXPORT ANIMAL STAFF
6505 Belcrest Road
Hyattsville, MD 20782

CURRENT DUTIES: The veterinary position assists with correspondence and serves as a source of regulations and protocols for the importation of certain animals, their semen, and embryos into the United States. He communicates these regulations and protocols and issues import permits to the importers of animals, semen, and embryos for the importation. Interprets, supports, and communicates with local, State and Federal Government agencies, officials, and APHIS line veterinarians and inspectors, foreign governments, transportation companies, brokers and foreign exporters concerning the importation of animals, animal semen, and animal embryos.

BACKGROUND DATA: Doctor of Veterinary Medicine from Ohio State University, 1958 USDA, FSIS, 18 months, line meat inspection, New York, Iowa and Ohio, USDA, Veterinary Services, Section VMO, in Ohio and Arizona; Port Veterinarian, New York, JFK Airport, Quarantine Veterinarian in Charge, New York Animal Import center; Staff Veterinarian for Import Bird and Poultry Staff and senior Staff Veterinarian, Import Animals Staff, Hyattsville, MD. Total USDA service of 28 years. Private practice, General Practice, 1 year; Small Animal Practice, 2 years in Ohio. Military Service, 2 years.

BIOGRAPHICAL SKETCH

NAME: Richard L. Rissler

TITLE: Assistant Director
Operational Support
Veterinary Services

BUSINESS ADDRESS: Room 750, Federal Building
6505 Belcrest Road
Hyattsville, MD 20782

CURRENT DUTIES: Provides leadership and directs staffs responsible for planning and development of cooperative State-Federal animal health programs and emergency animal disease eradication programs.

This includes planning and policy development for regulating import, export, and interstate movement of livestock and poultry.

BACKGROUND DATA: Attended West Virginia University and received B.S. (1959) and D.V.M. (1961) degrees from Oklahoma State University. He began his career with the Agency in 1961 and has had the following assignments:

1961-1965 Veterinary Medical Officer, Pennsylvania

1965-1968 Veterinary Medical Officer, Kentucky

1968-1970 Assistant Veterinarian in Charge, Connecticut

1970-1973 Assistant Veterinarian in Charge, New York

1973-1977 District Veterinarian in Charge, Pennsylvania and New Jersey

1977-1979 Area Veterinarian in Charge, Maryland, Delaware, Virginia, West Virginia, and the District of Columbia

1979 (6 mos.) Chief Staff Veterinarian, Animal Care

1979-1980 Assistant Director, Northern Region

1980-1982 Senior Staff Veterinarian, Sheep, Goat, Equine, and Ectoparasites Staff

1982-1988 Assistant Director, Domestic Programs, Veterinary Services

1988-Present Assistant Director, Operational Support, Veterinary Services

BIOGRAPHICAL SKETCH

NAME: Robert D. Whiting

TITLE: Chief Staff Veterinarian
Import-Export Products Staff

BUSINESS ADDRESS: USDA, APHIS, Veterinary Services
6505 Belcrest Road
Room 758, Federal Building
Hyattsville, MD 20782

CURRENT DUTIES: Dr. Whiting serves as the Chief Staff Veterinarian of the Import-Export Products Staff, Operational Support, Veterinary Services, Animal and Plant Health Inspection Service. Has the responsibility for planning, organizing, coordinating, analyzing, and monitoring activities involved in the importation and exportation of animal products, organisms and vectors. Responsibility involves protecting the United States against the introduction and dissemination of animal and poultry diseases of foreign and domestic origin.

BACKGROUND DATA: Dr. Whiting received his DVM and BS (Agriculture) degrees from the University of Georgia in 1959. Upon graduation, he spent 2 years in the U.S. Air Force Veterinary Corp. He began work with the U.S. Department of Agriculture as a field Veterinary Medical Officer in Georgia (1961-65); was assigned as a Brucellosis Epidemiologist in Wisconsin (1966-70); as the Assistant Veterinarian in Charge in Virginia (1971-72); and as District Veterinarian in Charge of Florida (1973-75). Dr. Whiting joined the Animal Care Staff as the Chief Staff Veterinarian, Animal Medicine and Technology (1976-79); assigned as the Area Veterinarian in Charge of Louisiana (1980-83); and returned to Hyattsville, Maryland, in 1983 as the Senior Staff Veterinarian, Interstate Inspection and Compliance. In 1986, he became the Chief Staff Veterinarian in Charge of the Import-Export Products Staff.

BIOGRAPHICAL SKETCH

NAME: John L. Williams

TITLE: Senior Staff Veterinarian, Emergency Programs, Veterinary Services,
Animal and Plant Health Inspection Service, U.S. Department of
Agriculture

BUSINESS ADDRESS: Room 745, Federal Building, 6505 Belcrest Road,
Hyattsville, Maryland 20782

CURRENT DUTIES: Correlates the uniform national programs and cooperative
eradication of diseases of livestock and poultry. Coordinates investigations
of suspect foreign animal diseases. Plans, formulates, and develops reports
and Agency guidance for the uniform application of disease surveillance,
eradication, disposition, and eradication guidelines.

BACKGROUND DATA: July 1988 - Present - Senior Staff Veterinarian
December 1985 - July 1988 - Assistant AVIC, GA
August 1984 - December 1985 - Swine Health Protection Program Coordinator
April 1982 - August 1984 - Veterinary Coordinator, NPIP
January 1978 - April 1982 - Staff Veterinarian, Veterinary Biologics
September 1977 - January 1978 - Relief Veterinarian - FL
June 1975 - September 1977 - U.S. Army Veterinary Corps
May 1975 - Graduate - School of Veterinary Medicine - Tuskegee University,
Tuskegee, AL

BIOGRAPHICAL SKETCH

NAME: D. D. Wilson

TITLE: Senior Staff Entomologist

BUSINESS ADDRESS: USDA, APHIS, Veterinary Services
6505 Belcrest Road
Room 728, Federal Building
Hyattsville, MD 20782

CURRENT DUTIES: Serves as the Senior Staff Entomologist, Cattle Diseases and Surveillance Staff, Operational Support, Veterinary Services (VS), Animal and Plant Health Inspection Service. He has the responsibility for planning, coordinating, analyzing, and monitoring tick eradication activities in Puerto Rico and tick surveillance and control activities along the Texas/Mexico border. Represents VS in establishing and maintaining liaison with Federal and State agencies, universities, foreign countries, international organizations, and industry to evaluate the biology, surveillance, and control and eradication of exotic and native ticks. In addition, he provides information to other VS staffs on ticks and other arthropods of veterinary importance.

BACKGROUND DATA: Dr. Wilson received his Ph.D. in Entomology from Texas A&M University in 1973. Following a year of postdoctoral study, he joined the U.S. Department of Agriculture. His first assignment was in Mission, TX, as an entomologist for the U.S. Screwworm Program. From 1975 to 1981, he served as the Entomologist-in-Charge of Fly Production at the Mission facility. In 1981, he was transferred to the Technical Support Staff, Emergency Programs, in Hyattsville. Since that time, he has served as a Staff Officer on various staffs at headquarters. In 1988, he was assigned to the Cattle Diseases and Surveillance Staff.

